

Supplementary data 5. Statistically significant networks derived from differentially abundant proteins found between glioma grade III of astrocytoma neovascularization vessels and controls. Note: Red is an up-regulated protein molecule, green is a down-regulated protein molecule, and black is a protein molecule with almost no change in expression.

Networks	Molecules in Network	Score	Nodes	Identified DEPs	Top Diseases and Functions
1	60S ribosomal subunit, ACAT1, ALPPL2, ALYREF, ARL8A, BTNL2, BUB3, CAPNS1, CHPF, DDX46, EFHD1, EFHD2, EIF2S2, ERH, EXOSC6, farnesyl transferase, FASTKD2, FNTB, H2AFY2, HDGF, HDGFRP2, HIST1H1C, HNRNPD, HNRNPL, 1TGA4, Lamin b, LARP1, LSM3, LSM8, LSM14B, MRPL16, NOLC1, PABPC4, PAN2, PHLPP1, Pkc(s), POGZ, PUF60, PBM8A, RBMX, RCN2, Ribosomal 40s subunit, Rnr, RPL28, RPL18A, RPL35A, RPLP2, RPS5, RPS10, RPS16, RPS18, RPS27A, SAFB, SERBP1, SF3A2, SLC6A1, SLC6A9, SMG8, snRNP, SNRPA1, SNRPB2, SNRPD2, SNU13, SRRT, SRSF3, SUB1, Tap, U2AF2, U2AF1/U2AF1L5, YBX1	92	70	62	Cancer, Organismal Injury and Abnormalities, Gastrointestinal Disease
2	ACTC1, Ampa Receptor, ANKS1B, ARAP1, Arp2/3, ARPC3, BSN, Camk, CAMK2B, CaMKII, CRIP1, CSRP1, DBNL, DFNA5, Dynamin, EF-1 alpha, EGFR, Endophilin, F Actin, FABP7, FAH, FAP, FARSA, G-Actin, Gamma tubulin, GOT, GRI, GRIA, GRIA3, GRIA4, GRIN1, HLA-B27, HLA-DQA1, IPO13, ITPKA, LDB3, LMOD1, MAP6, MME, MRPL44, MYH8, MYH11, MYL9, Myosin, NANS, Pp2b, PRPSAP2, PRRT2, RAB3A, Raf, SH3GL3, SH3KBP1, SH3PXD2B, SLC16A1, SLC22A5, SPARCL1, SRCIN1, SSR4, SUGP2, SYDE1, SYN1, SYN2, SYN3, TM9SF1, TPM1, TPM3, TPM4, Tropomyosin, TUBGCP2, WDR33	68	70	52	Cell-To-Cell Signaling and Interaction, Nervous System Development and Function, Cardiovascular Disease

3	ACSL5, ANGPT2, BGN, C1QA, Casein, CCDC53, CELF1, CNTN1, COL1A2, COL3A1, Collagen Alpha1, Collagen type II, CTSG, CTTN, Cytokeratin, DSG2, DYNC1LI2, EFEMP1, EFEMP2, ELANE, ERK, FBN1, Fc gamma receptor, Fgf, FGF2, FGF12, Hspg, HTRA1, Igfbp, IGFBP7, IGHA2, KRT1, KRT3, KRT5, KRT8, KRT9, KRT16, KRT6A, LGALS1, LPCAT1, Mac1, MCAM, MFAP4, Mmp, MMP8, MMP9*, MMP28, NFASC, NUDCD2, Par, PDGF-AA, plasminogen activator, PPBP, RARRES2, S100P, SEC11C, SERGEF, SERPINE1, signal peptidase, SLC4A7, SPARC, Tenascin, Tgf beta, TGFB1*, Timp, TNC*, TNR, trypsin, VCAN, voltage-gated sodium channel	65	70	50	Cancer, Organismal Injury and Abnormalities, Gastrointestinal Disease
4	14-3-3, ACTB*, Actin, ADRPK1, Beta Tubulin, CACNA2D1, Calmodulin, CANX, CAPS, CAPZB, Ck2, CNTNAP2, CPSF3, CRYAB, CWC27, CYBB, DLG4, EEF1A1, EPB41L2, EPB41L3, Erm, FBXO21, FLNA*, G protein, GABRG2, GBP1, HSP, Hsp90, HSPA12A, HSPB8, Insulin, LRRTM1, MAG, MAP4, METTL7B, MYADM, MYO1B, N-Cadherin, N-type Calcium Channel, NAPB, NEK6, NRXN2, OLFML3, OPCML, P38 MAPK, p70 S6K, PIP5K1A, PLXNC1, PPP3CB, PTBP3, RTN4, SEC61A1, SIRT2, Snare, Spectrin, STXBP1*, STXBP5, SUSU2, Syntaxin, SYT1, TBCA, TUBA1B, TUBA1C, TUBA4A, TUBB2B, tubulin(complex), tubulin(family), tyrosine kinase, VAMP2, XPO5	64	70	50	Neurological Disease, Cellular Assembly and Organization, Cellular Function and Maintenance
5	ACADL, Alp, ALPI, ALPL, AMPK, ANAPC4, ATP5L, ATPASE, BOD1L1, C7, C8, C8B, CAT, CBFb, CEP170, Cg, CIRBP, CKAP4, CLDN11, COL1A1*, COX5B, CPEB2, Cyclin B, Cyclin D, CYFIP2, cytochrome-c oxidase, ERCC5, FAM134C, FSH, Growth hormone, Gsk3, GTPASE, HERC2, Histone h3, HLA-B, HMGN1, HPRT1, Hsp70, ICAM1, IL1, LCLAT1, Lh, Mitochondrial complex1, MT-CO1*, NTRK2, OGN, P4HA2, PADI4, PCNA, PHF8, PMM2, PRELP, Pro-inflammatory Cytokine, PTGS1, PTPase, PTPRN2, RIN3, RNA polymerase II, RPAP1, SELP, SLC12A5, Sod, SOD2, TFCP2L1, TMED2, TMEM119, Tnf(family), TP53I11, WDR5, ZBTB18	61	70	48	Cancer, Organismal Injury and Abnormalities, Reproductive System Disease

6	15-LOX, ABCG2 , AKR1C1/AKR1C2 , Alpha Actinin, Alpha catenin, Angiotensin II receptor type 1, AP-3, AP3B2 , APC/APC2, BPI , C4orf27 , Cadherin, CD36 , CDC42EP1 , CDH10 , CHI3L1 , CIDEB , CRIP2 , CTNBL1 , EHHADH , elastase, estrogen receptor, ETS, FMNL2* , GFAP , GLA , GP9 , histone deacetylase, IDH1 , JUP , LOXL2 , LTF , MARCKSL1 , MT3 , N-cor, NCOR-LXR-Oxysterol-RXR-9 cis RA, NEFL , NFkB(complex), NFKBIE , NNMT , Nr1h, Nuclear factor 1, NUMBL , NUP43 , OAS3 , OSGEP , PADI2 , PARVB , Pdi, PDLIM7 , PKP4 , PLIN2 , PRPH , Rar, RPL7A , Rxr, secreted MMP, SLC16A3 , STK10 , SV2A , SWI-SNF, T3-TR-RXR, TFIIA, TGFB1I1 , thyroid hormone receptor, TIMP1 , TINAGL1 , TPM2 , VIM , VSNL1	57	70	46	Cardiovascular Disease, Neurological Disease, Cell Death and Survival
7	aldehyde, dehydrogenase(NAD), ALDH, ALDH2 , ALDH1A2 , ALDH1B1 , Alpha 1 antitrypsin, ANK2* , Ap2 alpha, APOC1 , APOC3 , ATP1A2 , ATP1A3 , C4, C4A/C4B , CA1 , CD163 , CEACAM8 , CNP , COL4A3BP , Collagen type ix, creatine kinase, DLG2 , DPEP1 , EGLN2 , ERGIC3 , ERK1/2, FES , Fetal Hemoglobin, FGA* , FGL1 , FSTL1 , FXDY1 , GUCY, GUCY1A2 , HBA1/HBA2* , HBB* , HBD , HBE1 , HBG2 , HBZ , HDL, HDL-cholesterol, hemoglobin, HPSE , HSPG2 , LDL, LIPA , LPL , MARCKS , MPO , Na ⁺ , K ⁺ -ATPase, Na-k-atpase, NPC2 , NSUN2 , PON2* , PRKAA, PRMT1 , PTPMT1 , Rbp, RBP4 , SAA, SLC1A4 , SLC26A2 , Sphk, STAT5a/b, STRA6 , UBA5 , VLDL, VLDL-cholesterol	56	70	47	Protein Synthesis, Hematological Disease, Hereditary Disorder
8	20s proteasome, 26s Proteasome, ADH1B , ADHFE1 , alcohol dehydrogenase, ALOX12 , Alpha tubulin, ANGPTL2 , ARID1A , ASXL1 , C/ebp, C1QTNF5 , Calcineurin protein(s), calpain, CASP6 , caspase, CD177 , CRABP1 , Ctbp, CTSB , Cyclin A, Cyclin E, cytochrome C, ECM1 , ERO1A , ERP29 , FAIM2 , Hdac, HDAC1 , HISTONE, Hsp27, Ifn gamma, Importin beta, LDL-cholesterol, LMNB1 , MFRP , MIF , MT1G , Mucin, NACC1 , NCS1 , NDUFA13 , Nos, Notch, NPL , NUP153 , PARP, PDE6D , PKN2 , PLXNA2 , PRSS57 , PSMB10 , PSME3 , PTGDS , PTRH1 , Rb, RCN1 , SCIN , SDCS , Secretase gamma, SERPINA1 , SHBG , SMARCE1 , SMC4 , SNCB , TCF, TRAIP , TSH, TXNIP , Vegf	49	70	43	Developmental Disorder, Hereditary Disorder, Ophthalmic Disease

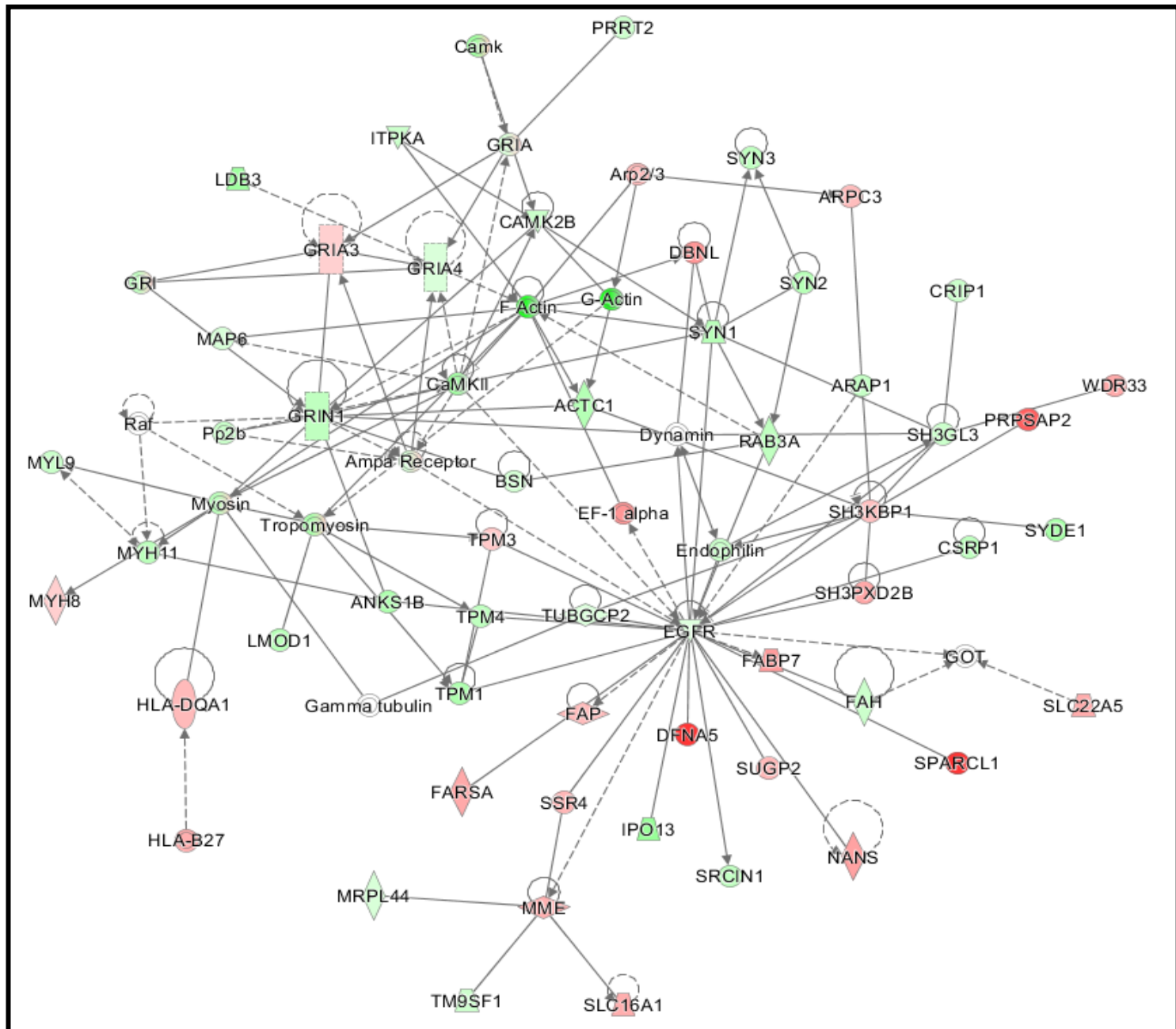
9	ALT, ASAH1 , BCR , BCR(complex), BTK , C1q, CAMP , CD8A , CFH , Cpla2, CTNNA4 , DHCR7 , F8 , Fcer1, FCGR1B , FCN1 , FETUB , FMOD , GBA , GIMAP1-GIMAP5 , Gm-csf, HLA-DPA1 , HLA-DR, HLA-DRA , Hla-Drb, HLA-DRB1* , HLA-DRB3 , HMG CoA synthase, HRNR , IFN Beta, Iga, IgG, IgG1, IgG2b, IgG2b, IGHG1* , Igm, IL12(family), Immunoglobulin, Interferon alpha, Ldh(complex), MAL2 , Mapk, MBP , MHC CLASS I(family), MHC Class II(complex), Mhc2 Alpha, NAMPT , NAT10 , NCF2 , NFAT(complex), NSDHL , PDPN , PEX5L , PKN1 , plc beta, PLC gamma, PLCG2 , PLP1 , POTEE/POTEF , PRG2 , PTX3 , SCAP , Sos, SPTLC2 , SUSD5 , SYK/ZAP, TEC/BTK/ITK/TXK/BMX, THUMPD1 , TPD52L1 , VAV	45	70	40	Cancer, Organismal Injury and Abnormalities, Gastrointestinal Disease
10	ALDH1B1 , ANKRD17 , ANKRD13A, ANKS1B , APEH, API5, APT , ATL3 , ATP2B3 , ATP2C1 , ATP6V1A , BARX1 , BCL2L1, BCL2L12, bisphosphoglycerate phosphatase, DCLRE1A, DCUN1D1, DHRS2, EEF1B2 , ERGIC1, EXD2, FBP1 , GDA , H2AFY2 , HARS , HPCAL1 , KLF7, LHX8 , LMNA, Mapre2, MRPL12 , MRPS26, MRPS31 , MRPS35, MRPS18B, MTDH , MYO9B NADSYN1 , NES , OTUD5, PAFAH1B2 , PGAM2 , PLOD1 , PRPSAP2 , PSEN1, RCCD1 , RNF20, RPS27L , SCN3B, SCPEP1 , SEMA3G , SLC25A4 , SLC6A1 , SMG7, SPNS1 , SV2B, THUMPD3, TIGAR , TMEM164 , TP53, TPPP3 , TSPYL2, TTC28, UBC, Ube3, Ubiquitin, UNC79 , VWA8 , WDR91 , ZNF699	37	70	36	Cancer, Organismal Injury and Abnormalities, Gastrointestinal Disease
11	ACYP2 , ALG11 , ALKBH5, ATP2C1, C19orf70 , C1QL1 , C3orf33, CD33 , CEL , CHST7 , CHSY1 , CLDN11 , COTL1, COX15, CRB2 , CREBZF, CTTN , DPP10 , DTX3L , EED, EFHD2 , ELAVL1, EXOG , FAM20B, FBXO30, FOS, GLCE, GLIPR2, HCN3, HSD17B11, IL4, LETMD1, LGALSL , LRRC37B , MAN1A2 , MOSPD2, MSI1 , MTR , MTRR, MXRA7 , MYADM , MYO5C, NDUFA13 , OMG , OSTC , P3H1 , PBX2, PEX19 , PEX26, PLD6, POLR3D , PRR3, PSMG3 , RPIA , RPS27L , SELT, SMAD2, SMG7, SULT2B1, TBCA , TM9SF4 , TMEM56 , TMEM65 , TMTC1 , TMTC4, TMX1 , TMX2,, VHL, VILL , VMA21, ZNF652	36	70	34	Amino Acid Metabolism, Small Molecule Biochemistry, Embryonic Development

12	ABHD10, ABHD11 , AK5 , APP, ATCAY , ATXN1, CAMKV , CFL2, CLIC6 , COPS3 , CPNE6 , CRIP2 , CSNK2A1, CXorf56, DMD, DNAJC4, DNAJC5, CNAJC8, DTD1 , E2F1, EXOSC9, EYA4, FAM49A , GALK1 , GRAMD4, GSTO1, HIC2, HINT2 , HSP90AA1, HSPB1, HSPB7, IARS2, ISOC2, JMY, KCMF1 , KCNC1, KCNN3, KLHL36 , LDB3 , LY6H , mir-149, MOBP , MRGPRF , MSI1 , Mt3, MURC, MYH8 , MYOZ1 , N-acetyl-L-aspartic acid, NARS , OGN , P2rx7, PDK2 , PGM5 , PHYHD1 , PHYHIPL , PMP2 , PPP1R8, PSAT1 , PTGDS , SLC17A5 , SLC6A13 , ST3GAL6, STK33, TFB1M , TSPY2(includes others), UBXN7 , VAT1L , WNT3A, XK	36	70	35	Neurological Disease, Skeletal and Muscular Disorders, Cellular Compromise
13	ADGRA1, ADH6, butyric acid, C3AR1 , CAMK2N1, CARS , CD163 , CES2 , CHST11, CLCN6 , COTL1, CRIP1 , DOLPP1, DPP6 , ENC1, ENGASE , ERBB2, EXT2 , FAM160A2 , Fetal Hemoglobin, GABRB2 , GATA6, GLCE, GNRH, GPR146, GPR158, GRHL1, GTPBP10 , HIF1A, histamine, HM13 , HNF4A, HNMT , KLK14, LOC344967 , LOXL2 , MORC2 , MUCL1 , MYO9A , NANOG, NDST1, NPTN, PDK2 , PRG3 , PRL, PRR30 , PZP , SEC11C , SELENBP1* , SGSH , SHISA5, SLC22A18, SLC35A2, SLC5A5, SMTN , SPAG4, SPARCL1 , SSR3 , TGFB1, TGFB1* , THSD4, TRAM1 , tretinoin, TSC22D2 , UBE2Q1 , USH1C, XBP1, ZNF146, ZNF326 , ZNF440	35	70	35	Carbohydrate Metabolism, Small Molecule Biochemistry Cellular Development
14	Akt, APBB1IP , ARAP3 , ATXN2L , c-Src, CAV2 , Caveolin, CD151 , chymotrypsin, COL12A1 , COL2A1 , COL4A3 , COL5A1 , COL5A3 , COL6A3 , COL7A1 , collagen, Collagen type I, Collagen type III, Collagen type IV, Collagen type V, Collagen type VI, Collagen type XVIII, Collagen(s), Complement component1, DDR1 , Ecm, F13A1* , factor XIII, FERMT3 , Fgfr, FGG* , Fibrin, Fibrinogen, FSD1 , FYB , GPIIB-IIIA, growth factor receptor, IGFBP2 , Integrin, Integrin alpha 2 beta1, Integrin alpha 3 beta 1, Integrin alpha 4 beta 1, Integrin alpha 5 beta 1, Integrin alpha V beta 3, Integrin α , ITGA2 , ITGA6 , ITGA8 , ITGA2B , ITGB3 , JINK1/2, Laminin, Lfa-1, PDGF(family), PECAM1 , PIP , PLEK , POSTN* , Ptk, RDH10 , SERPINH1 , SRSF5 , SYNM , Talin, TGFB β , THBS1* , TPPP , WASF2 , Wnt	34	70	35	Tissue, Development, Cancer, Connective Tissue Disorders

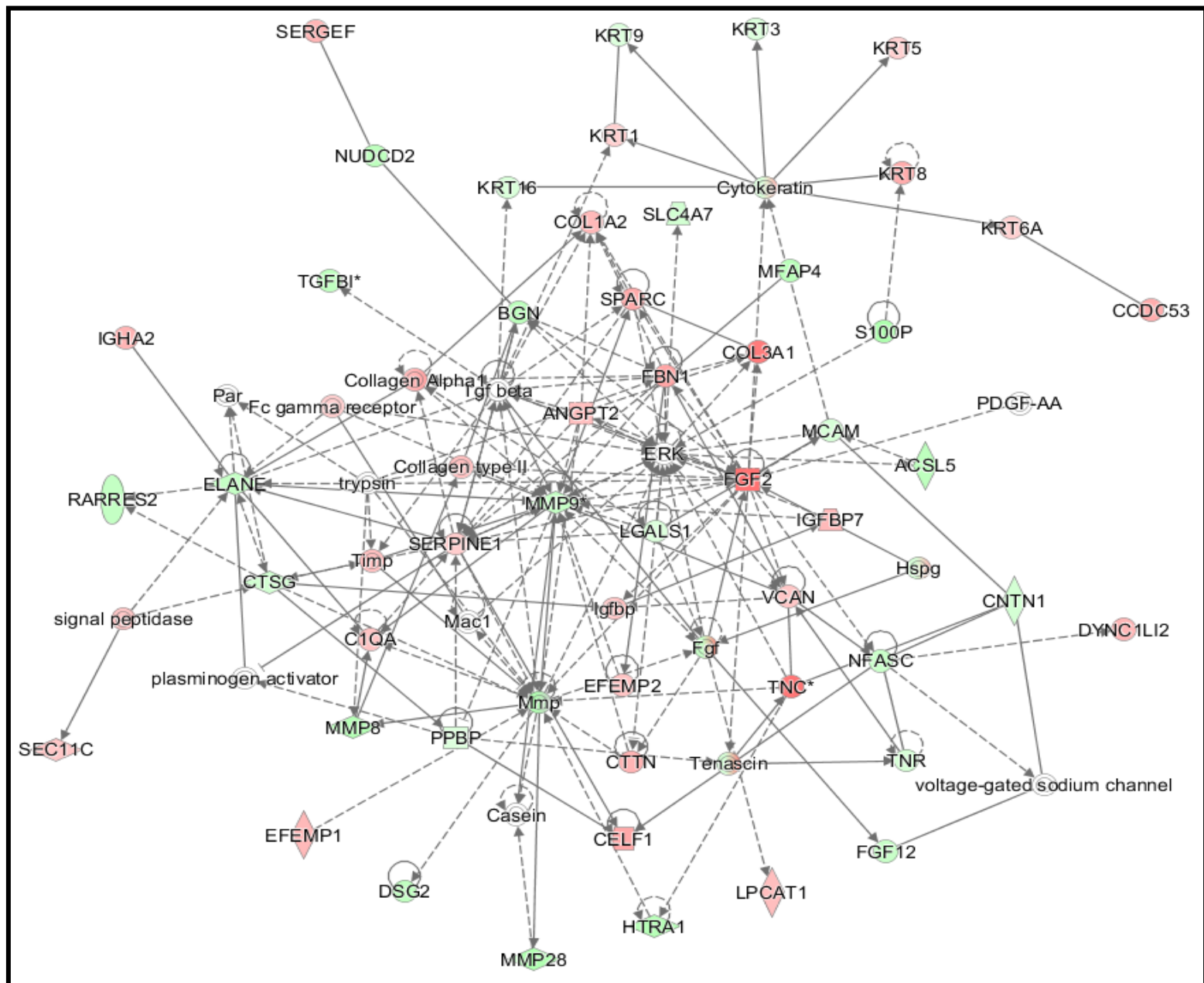
15	Adaptor protein 1, amylase, Calcineurin A, Cd1, CD33 , Cdc2, CELF2 , CLINT1 , DHPS , E2f, EIF2AK2 , EPX , FAM118A , FAM118B , FBXO2 , FKBP9 , FKBP1A , FNDC3B , GJB2 , HINT1 , Ifn, IFN alpha/beta, IFN type-1, Ifnar, Ige, Igg3, IgG2a, Ikb, IKK(complex), IKK(family), IL12(complex), IL1RAP , I18r, IRAK, IRAK4 , ISG15 , ISG20 , Jnk, MAP1LC3, MAP3K, MAP3K10 , MAVS , MFN1 , MHC, MHC Class I(complex), MHC II, Peptidylprolyl isomerase, PPIC , PURB , RAB27B , RSU1 , SERPINB3 , SGSH , SIAE , Smad, Smad1/5/8, Smad2/3, Smad2/3-Smad4, TGFB3 , TH2 Cytokine, Tip60, Tlr, TLR8 , TMSB4, TMSB10/TMSB4X , Tnf receptor, transglutaminase, TREX1 , TRIM21	30	70	33	Cell signaling, Inflammatory Response, Inflammatory Response
16	ADCY, ADCY3 , ADIPOQ , ADRB, AOC3* , Atrial Natriuretic Peptide, atypical protein kinase C, BCAM , CALR , CAMK1 , CaMK I, CAMK2A , CAV1 , CD200 , CNN1 , Cofilin, Creb CSRP2 , DAB2 , DCK , DGAT1 , FGB , G protein alpha, GDA , GNAO1 , GNAZ , Homer, HOMER1 , ITPR, KALRN , KLK6 , L-type Calcium Channel, Laminin1, Lpa receptor, LRP, Mek, mGluR, mGLUR Group I, MIR124, Mlc, NCAM1 , NCK, NES , NFkB(family), Pak, Pde, Pdgf(complex), PDGF BB, PI3K(complex), Pka catalytic subunit, Pkg, PLA2, Pld, PP1 protein complex group, PP2A, Ppp2c, Rab11, RAB11FIP5 , Rap1, RASA3 , RETSAT , Rock, RPS27L , RYP2 , SLC29A1 , SLC2A3 , SLC39A12 , Stat3-stat3, TRPC6 , "	30	70	32	Cancer, Gastrointestinal Disease, Organismal Injury and Abnormalities
17	Adaptor protein 2, Ap1, ATP11B , BCAT1 , CA3 , CALCRL , CAPN2 , CASPASE 3/7, CD3, Clathrin, CPVL , DACT1 , DPYSL3 , ENPP6 , FGF1 , Focal adhesion kinase, G protein alphas, G protein beta gamma, G-protein beta, G-protein gamma, Girk, GNG2 , GPCR, GPR37 , GRM1 , GRM3 , GRM5 , Histone H1, JAK, MAP2K1/2, MTORC1, NADPH OXIDASE, NASP , NEGR1 , Nfat(family), NMDA Receptor, NT5C , NT5C3A , NUDT2 , P110, p85(pik3r), Pdgr, phosphatase, PI3K(family), PIGS , Pka, PLC, PP1-C, PIP5K1 , PPM1H , PPP1CC , PPP1R18 , PTPN1 , PTPN7 , Rac, Ras, Ras homolog, RHOV , Rsk, Sapk, Sfk, Shc, SIRPA , SRC(family), ST8SIA3 , STAT, TCR, voltage-gated calcium channel, XPR1 , YAP1	29	70	32	Post-Translational Modification, Cell-to-Cell Signaling and Interaction, Nervous System-Development and Function

18	ABCB9, ADAM2, ADAM19, ADAM20, ADAM21, ADAM23, ADAMTS2, ADAMTS6, ADAMTS9, ADAMTS13, AHR, AIG1, APOA1, ARSF, ASPN, BORCS5, CC2D1B, CCDC87, CES2, CNN1, Collagen Type XI, DNAH1, DNAH5, DNAH6, DNAH8, DNAH10, DNAH12, DNAL1, DYNLT1, EHD2, EMILIN2, ENPEP, EP300, ERAP2, EWSR1, FAM169A, KEL, LNPEP, MACROD1, MANF, MAP7D1, MED14, MED24, MED28, MED12L, MED13L, mediator, Metalloprotease, MMP2, MMP11, NEBL, NFATC1, NR1I2, OLFML1, OSTF1, PLSCR1, PPIC, PROCR, PTH1R, PXR ligand-PXR-Retinoic acid-RXRα, REL, SLC27A3, SLC35A2, SLC47A1, sn-glycero-3-phosphocholine, SORBS2*, SPP1, TADA2B, TBC1D9, TFIIR, TMEM165, TRAP/Media, TXLNG, ZFC3H1	28	70	29	Cardiovascular Disease, Organismal Injury and Abnormalities, Protein Synthesis
19	AADAC, ABCD4, ABI3BP, ADGRG2, ALG1, ARRB2, ATP5G1, ATP5S, AVPR18, BBOX1, beta-estradiol, C14orf2, C6orf89, CASC4, CCT6A, COL4A6, CPNE1, CPZ, CSTF3, CTHRC1, CTNNB1, CXADR, ER-α-Estradiol, FBXO6, FGD6, FGFR1, FHOD1, GRB2, GRM3, HCRTR2, HDGFRP3, HPCAL4, HSD17B11, HUNK, IGF1R, IGKV1D-8, JUN, KCTD16, KIAA0922, KRT34, LY6G6F, MINK1*, mir-322, OSBPL7, OSM, POLR1B, PPRC1, Prl3d1(includes others), Proinsulin, PRSS35, PTGER3, PXDN, QSOX1, Relaxin, RPUSD2, SDK1, SLC22A8, SLC4A8, SSTR4, TBR1, TESPA1, TMED8, TMEM2, TPD52L1, TXNL4A, UNK, USP46, WWC2, YWHAZ	24	70	27	Cancer, Organismal Injury and Abnormalities, Gastrointestinal Disease
20	ACBD5, ARL15, ATP5J2-PTCD1, BTAFL1, BTF3, CCNT2, chemokine, CHMP7, CPSF3, DUB, EAF2, ERLIN1, FAAH, FUNDC2, GPD1, GTF2A1, GTF2A2, GTF2A1L, GTF2F1, GTF2H4, GTF3C6, HACD4, HAPLN4, Histone h4, Holo RNA polymerase II, IDO2, L-dopa, MRPL10, MRPL22, MRPL39, MRPL44, NXF1, PLPPR1, POFUT2, PSAT1, PTCD1, PTCD2, PTN, RENBP, RNA Pol-II Pre-Initiation Complex, RNA Pol-II-TFIIA-TFIIB-TFIID-TFIIF, RNA pol2-transcription factor, S100A9, SCUBE1, SLC22A17, SMYD5, SUPT4H1, TAF4, TAF5, TAF8, TAF11, TAF13, TAF1L, TAF5L, TAGLN, TFIIE, TFIIF, TMEM199, TTC39C, UNC119B, USP6, USP16, USP22, USP29, USP32, USP43, USP45, USP46, USP47, USP48, USP53, WLS	23	70	26	Cancer, Organismal Injury and Abnormalities, Gastrointestinal Disease

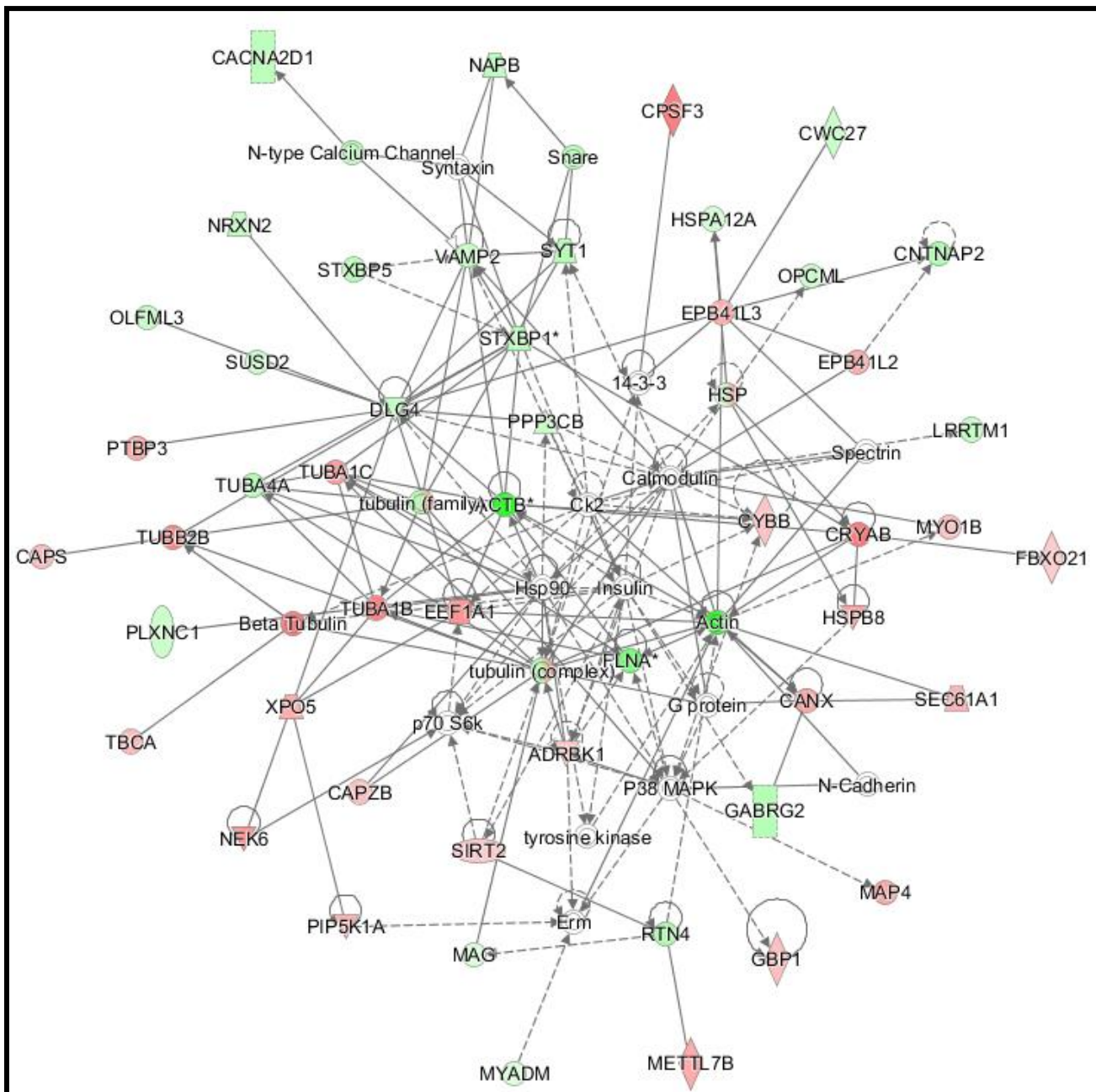
Network2



Network3

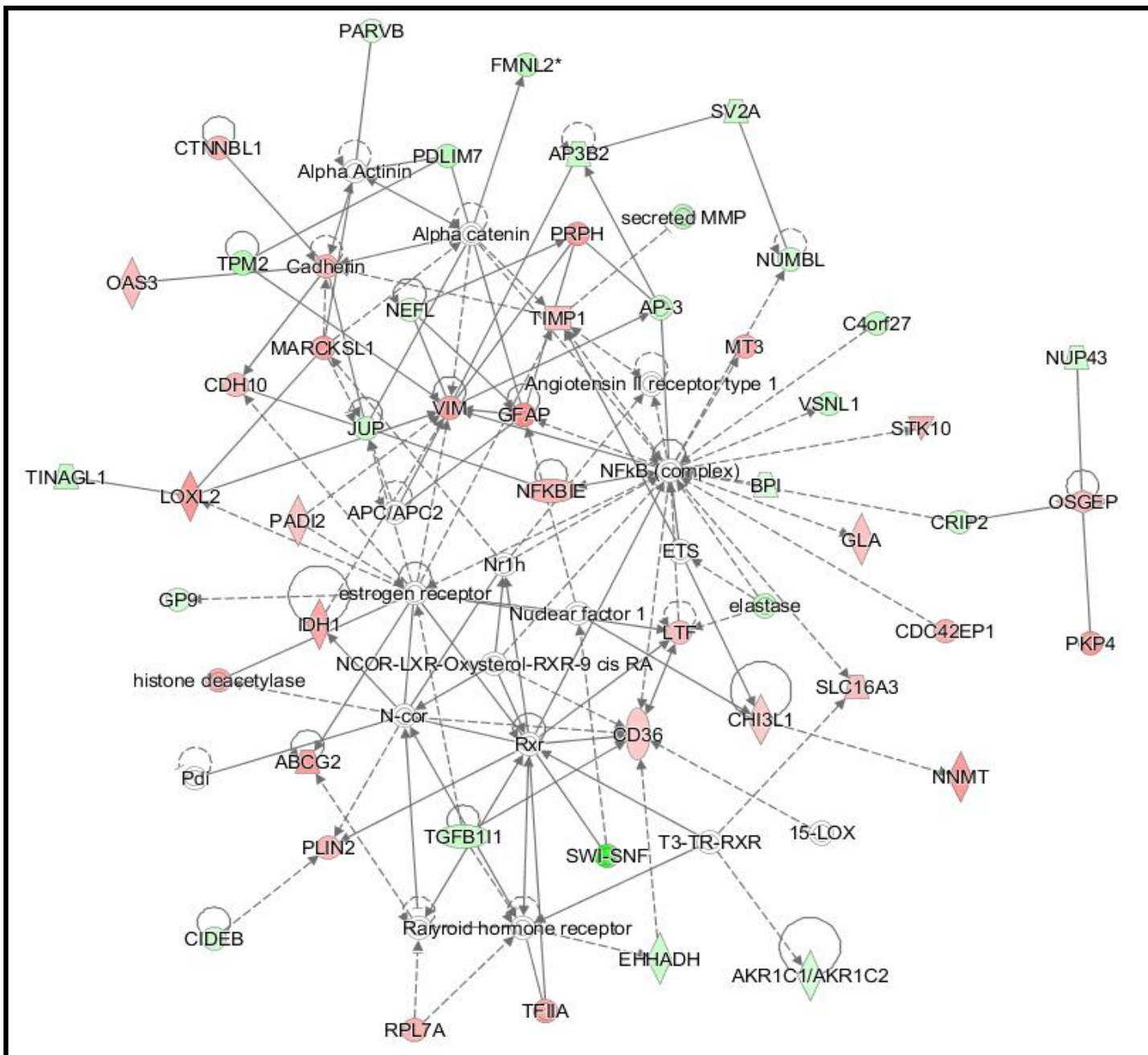


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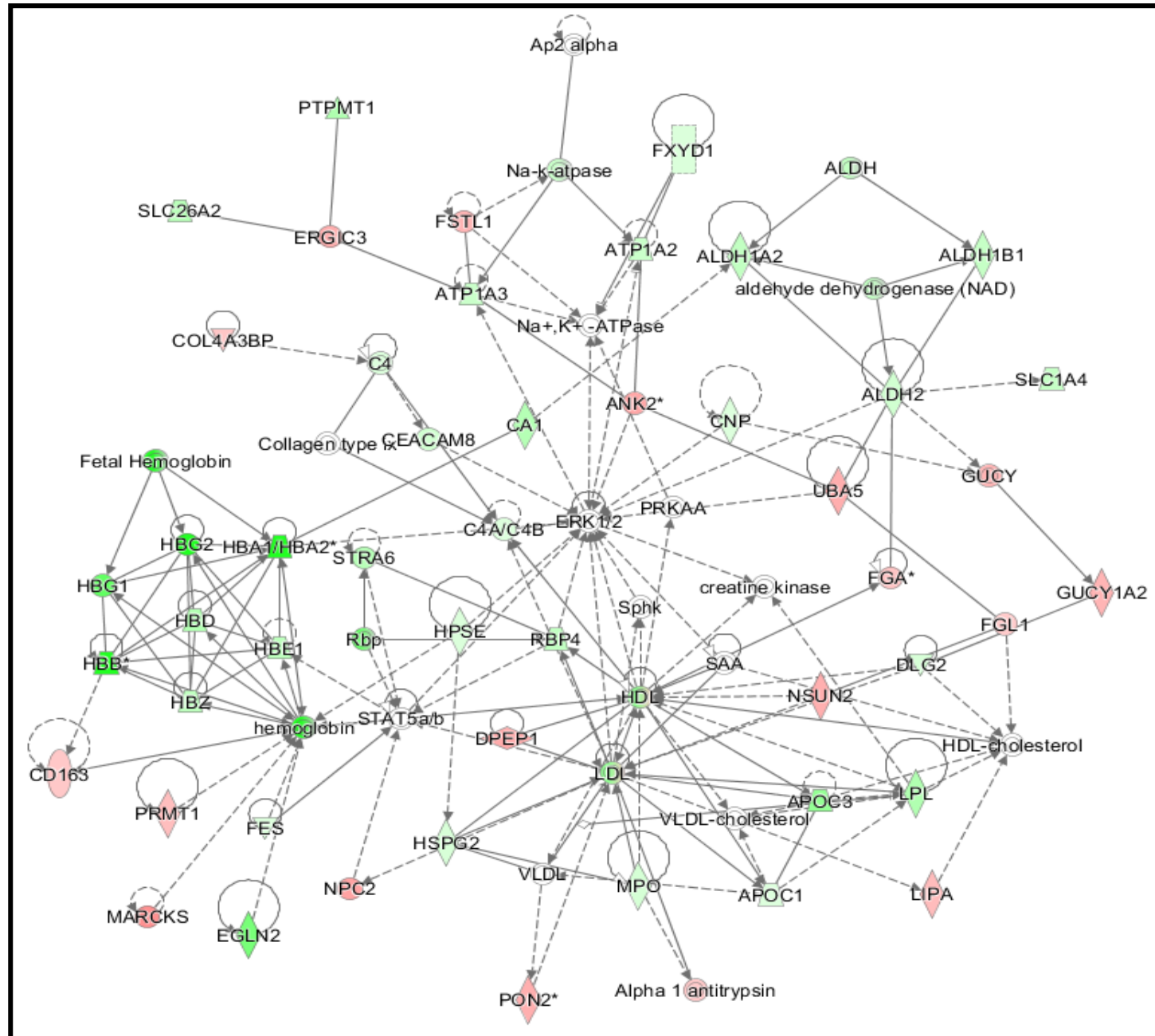


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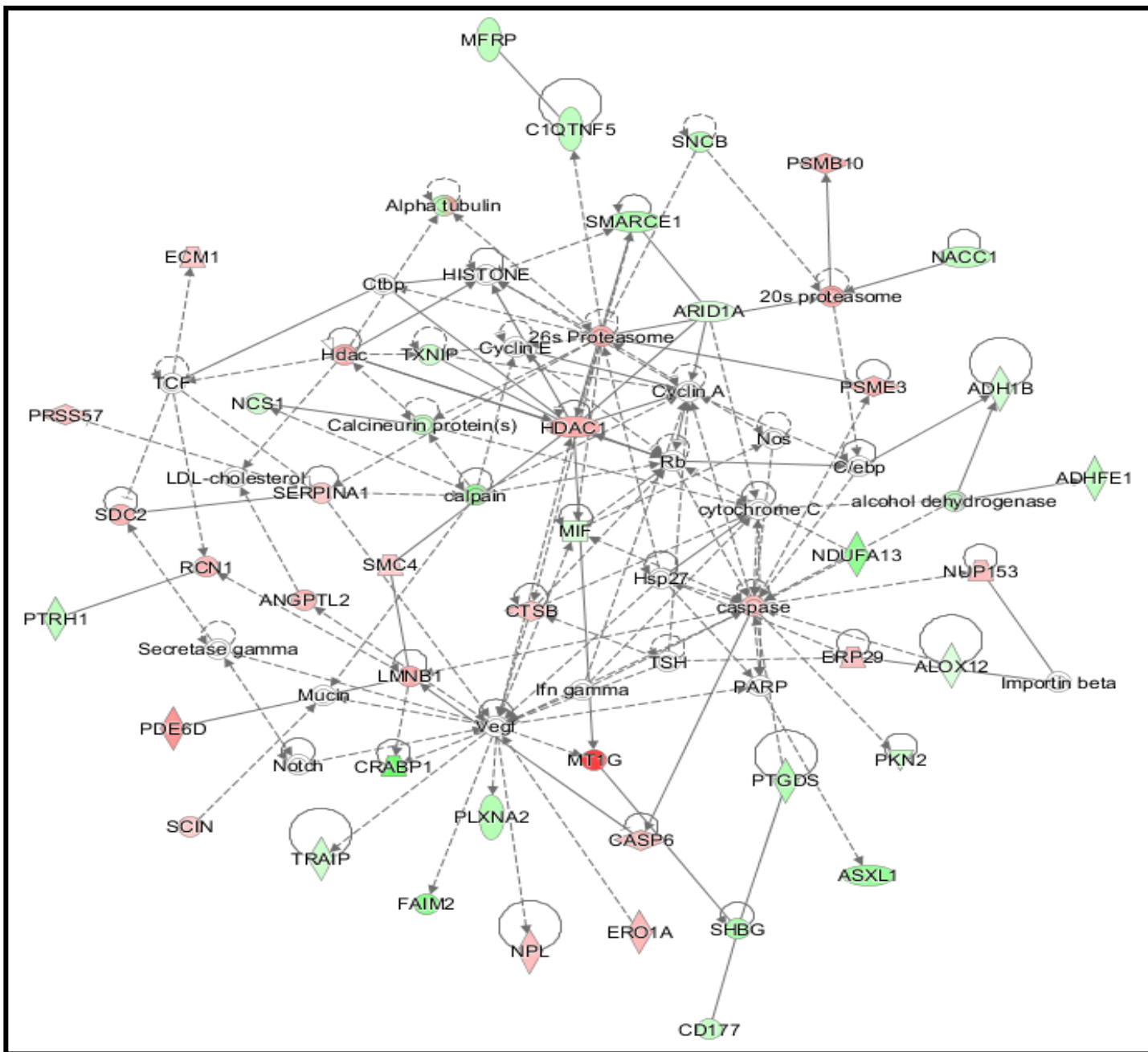
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Network7

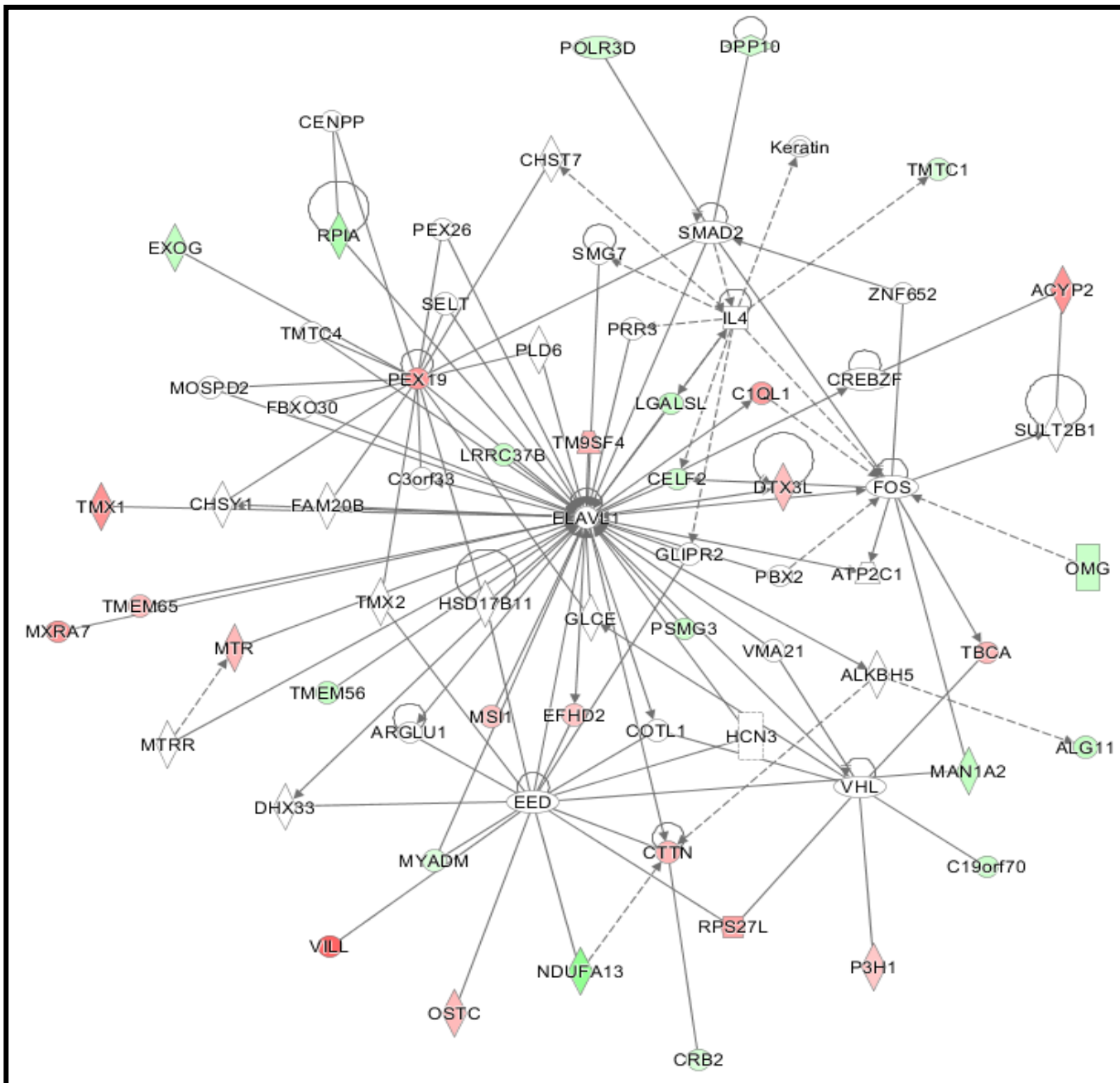


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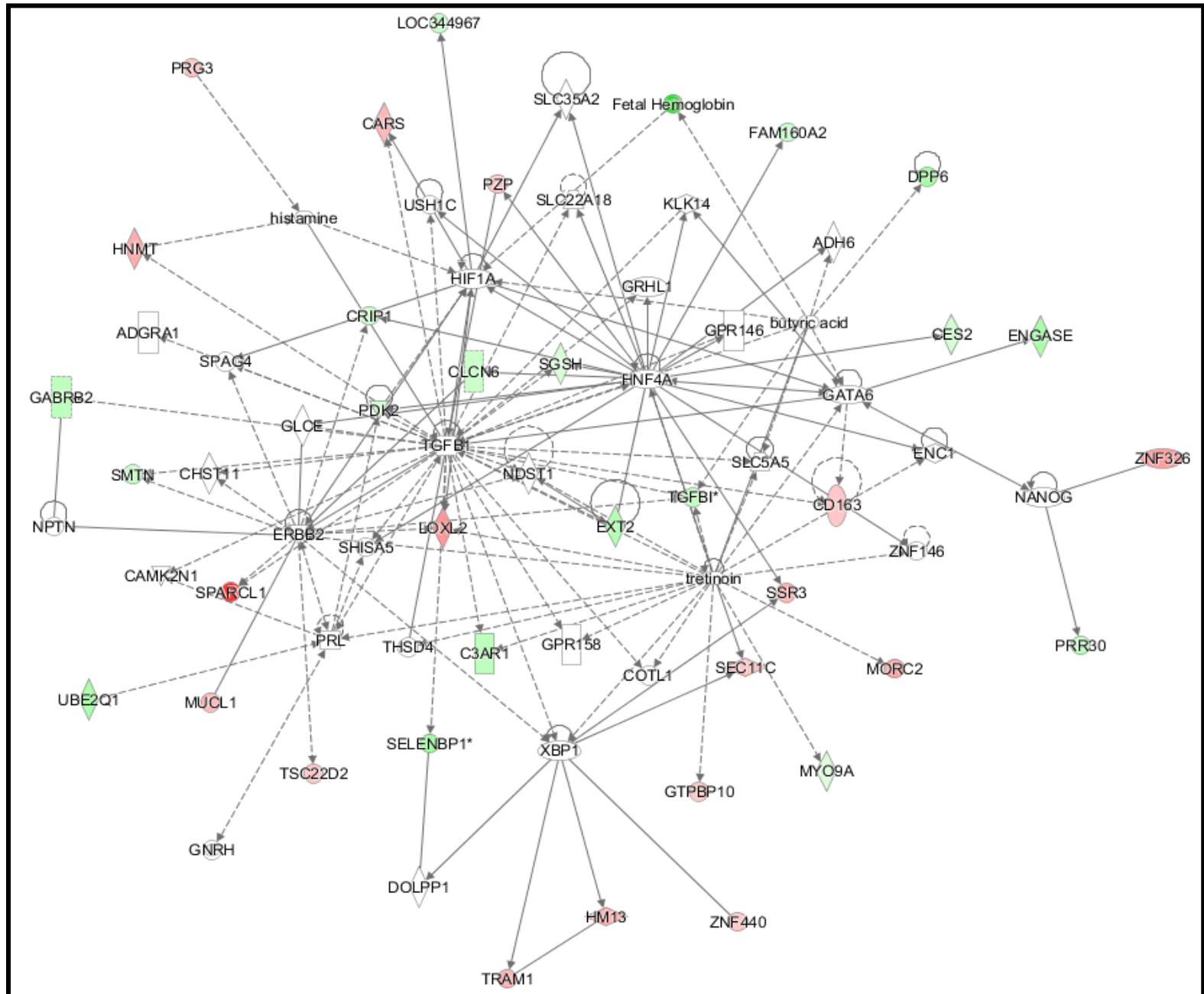
bisphosphoglycerate phosphatase

Network11

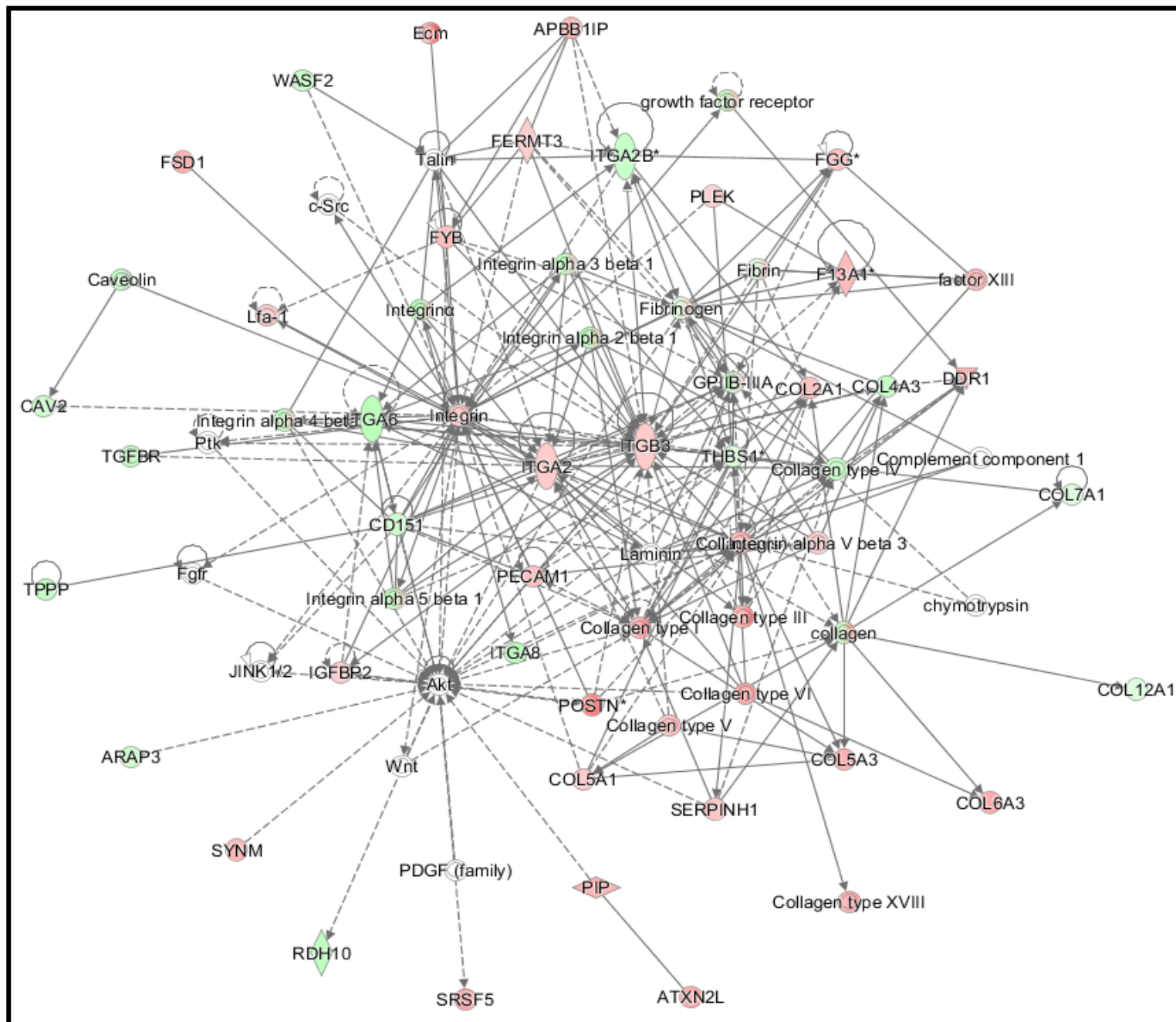


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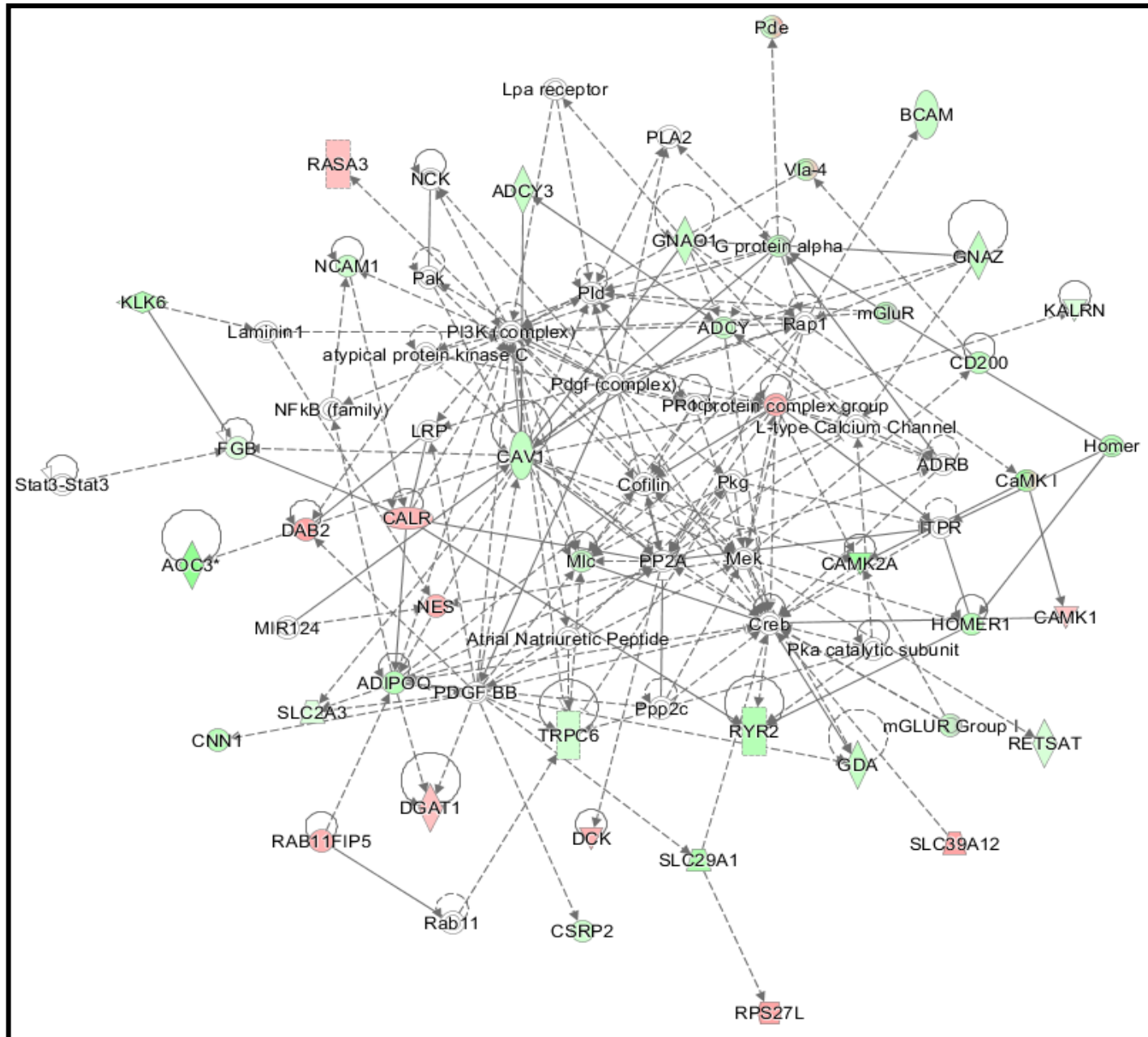
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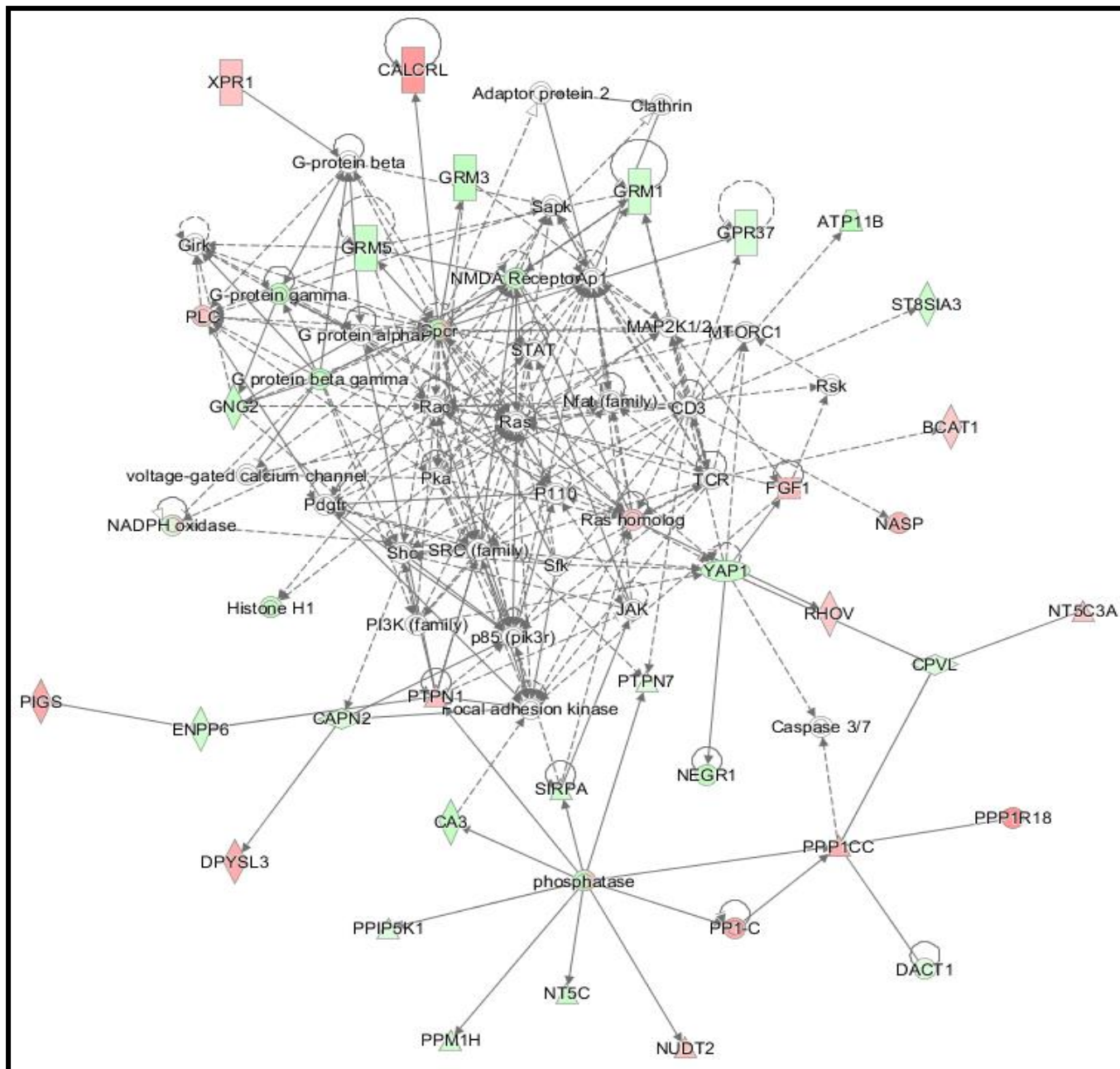
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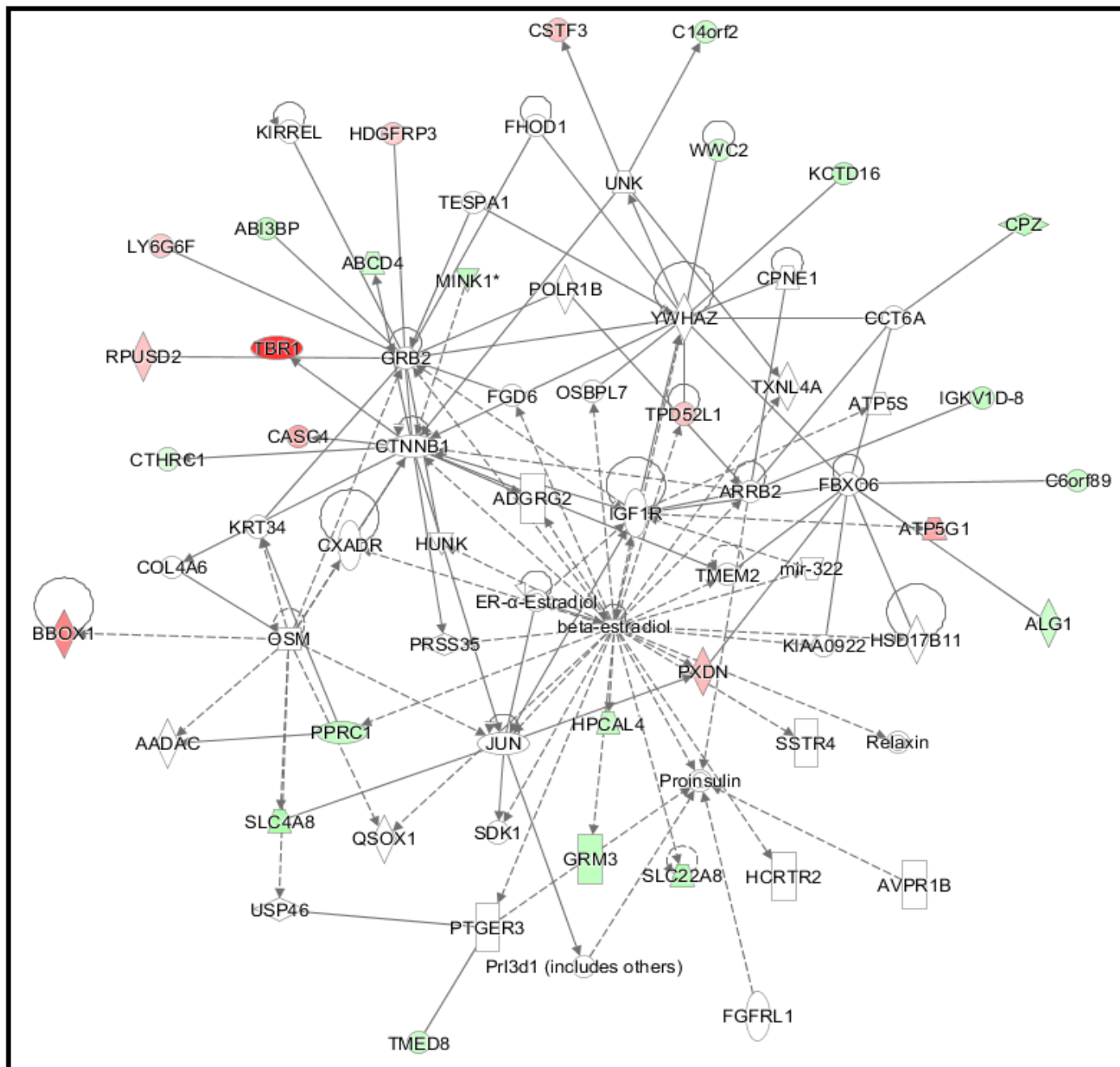
Network16



Network17



Network19



Network20

