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| **Cancer Type** | **Sample numbers** | **Genes** | **Core Enrichment** |
| **BLCA** | **Normal 19**  **Tumor 414** | AAAS, ACSS2, ADPGK, AGRN, AKR1A1, ALDOA, ALDOC, ALG1,ANKZF1,ARTN,AURKA,B3GALT6,B3GAT3,B3GNT3,B4GALT2,B4GALT7,BPGM, BPNT1,CASP6,CDK1,CENPA,CHPF,CHPF2, CHST1,CHST12,CHST6,CLDN9,CLN6,COG2,COPB2,DDIT4,DEPDC1,DHTKD1,EFNA3,EIF6,ENO1,ENO2,ERO1A,EXT1,EXT2,FH,  FKBP4,G6PC,GALE,GALK1,GALM,GAPDH,GAPDHS,GFPT1, GLCE,GMPPA,GMPPB,GPI,GUSB,GYS1,HAX1,HK1,HK2,HK3,  HMMR,HS2ST1,HS6ST2,HSPA5,IDH2,IDH3B,IDH3G,IDUA,  IGFBP3,IL13RA1,KDELR3,KIF20A,LDHA,LDHAL6A,LDHC,  MDH2,MED24,MIF,MIOX,MIR210,NANP,NASP,NDC1,NDUFV3, NOL3, NSDHL, NUP107,NUP155,NUP160,NUP188,NUP205, NUP210,NUP35,NUP37,NUP42,NUP43,NUP50,NUP58,NUP62,  NUP85,NUP93,OGT,P4HA1,PAXIP1,PC,PCK2,PDHA1,PDK3,  PFKFB1,PFKFB2,PFKFB4,PFKL,PGK1,PGLS,PGM2,PGP,PHKA2, PKM,PLOD1,PMM2,POLR3K,POM121C,PPFIA4,PPIA,PPP2R1A, PPP2R1B,PPP2R5D,PRKAG1,PSMC4,PYGM,RAE1,RARS1,RBCK1,RPE,SDHB,SDHC,SEC13,SEH1L,SLC16A3,SLC25A10,SLC25A13,  SLC37A4,SOD1,SOX9, SPAG4,SRD5A3,STC2,STMN1,TGFA, TGFBI, TP53, TPI1,TPR,TREH, TSTA3,VCAN, XYLT2 | **YES** |
| **BRAC** | **Normal 113**  **Tumor 1103** | AAAS,ACSS2,ADH1A,ADH1B,ADH1C,ADH4,ADH5,ADH6, ADPGK,AGRN,AKR1A1ALDH1A3,ALDH2,ALDH3A2,ALDH7A1,ALDOA,ALDOC,ALG1,ARTN,AURKA, B3GALT6, B3GAT3,B4GALT1,B4GALT2,B4GALT4, B4GALT7, BIK, BPGM, BPNT1, CACNA1H, CASP6,CBFA2T3,CDK1,CENPA, CHPF, CHPF2, CHST6, CLDN3,CLN6,COG2, COL5A1, COPB2, CXCR4, DEPDC1, DHTKD1, EFNA3, EGLN3,EIF6,ELF3,ENO1,ENO2, ERO1A, FAM162A, FBP1, FH, FKBP4, FUT8, GALE,GALK1, GAPDH, GMPPA, GMPPB, GNPDA1, GOT2,GPC1, GPC4, GPI, HAX1, HK1,HMMR,HSPA5,IDH2,IDH3G, IDUA, IER3, ISG20, JMJD8,KDELR3, KIF20A,LDHA,LDHB,MDH2, ME2, MED24, MIF,MIOX, MIR210,NASP,NDC1, NSDHL, NUP107, NUP133, NUP155, NUP188, NUP205, NUP210, NUP37, NUP43, NUP50, NUP58, NUP62,NUP85, NUP93,OGDHL,P4HA1,P4HA2, PAXIP1, PCK1, PCK2,PDK3,PFKFB1, PFKFB3,PFKFB4,PFKL, PFKP, PGAM1, PGK1,PGK2, PGLS, PGM1,PGM2, PGM2L1, PGP, PKM, PLOD1, PMM2, POLR3K, PPIA, PPP2CA, PPP2CB, PPP2R1A, PPP2R1B,PPP2R5D, PRKAG1, PRPS1, PSMC4QSOX1, RAE1, RARS1,RBCK1, RPE,SAP30,SDC1,SDHC,SEC13,SEH1L,SLC16A3, SLC25A10, SLC25A13, SLC35A3,SLC37A4,SOD1,SPAG4,SRD5A3, STMN1, TALDO1,TFF3,TIGAR,TP53,TPBG,TPI1,TPR,TSTA3,TXN, VCAN, VEGFA,XYLT2, ZBTB7A | **YES** |
| **HNSC** | **Normal 44**  **Tumor 502** | AAAS,ABCB6,AC016586.1,ACSS2,ACTN3, ADH1A, ADH1B, ADH4,ADH6, ADH7,ADPGK,AGRN,AKR1A1, ALDH1A3, ALDH2, ALDH3A1, ALDH3A2, ALDH3B1, ALDH3B2, ALDH7A1, ALDH9A1, ALDOA,ALDOC, ALG1, ANKZF1, ARPP19, ARTN, AURKA, B3GALT6, B3GAT3,B4GALT1,B4GALT2, B4GALT7, BPGM, CACNA1H, CASP6,CD44, CDK1, CENPA,CHPF, CHPF2, CHST1, CHST12, CHST2,CLN6, COL5A1,COPB2, CXCR4, DDIT4, DEPDC,1 DLAT, DLDEGFR, EGLN3,ENO1, ENO2,ENO3,EXT1, EXT2, FBP2, FKBP4, G6PC2, G6PD, GALK2,GAPDH, GCK, GMPPA, GNPDA1, GPC1, GPI, GPR87, HIF1A,HK1, HK2, HK3, HKDC1, HMMR, HS2ST1, HSPA5, IGFBP3, INS, ISG20, KDELR3, KIF20A, LDHA, MET, MIF, MIOX, NANP, NASP, NDC1, NT5E, NUP107, NUP133, NUP153, NUP155, NUP160, NUP188, NUP205, NUP210, NUP214, NUP35, NUP37, NUP42, NUP43, NUP50, NUP54, NUP58, NUP62, NUP85, NUP93, OGT, P4HA1, P4HA2, PC, PDHA1, PDHB, PDK3, PFKFB1, PFKFB3, PFKFB4, PFKL, PFKM, PFKP, PGAM1, PGK1, PGM1, PGM2, PGP, PKLR, PKM, PLOD1, PLOD,2POLR3K, POM121, POM121C, PPIA, PPP2CA, PPP2CB, PPP2R1A, PPP2R5D, PRKACA, PRKACB, PRPS1, PRXL2C, PSMC4, PYGL, PYGM, RAE1, RBCK1, RPE, SAP30, SEH1L, SLC16A3, SLC25A12, SLC25A13, SPAG4, STC2, STMN1, TGFA, TGFBI, TIGAR, TPBG, TPI1, TPR, TPST1, TREH, VCAN, VEGFA, XYLT2 | **YES** |
| **LIHC** | **Normal 50**  **Tumor 374** | AAAS,ABCB6,AC016586.1,ACO2, ADH1A, ADH1B, ADH1C, ADH4,ADH6, ADPGK, AGRN, ALDH1B1, ALDH2, ALDH9A1, ALDOA, ALDOB, ALG1, ANKZF1, ARNT, ARPP19, ARTN, AURKA, B3GALT6, B3GAT3, B3GNT3, B4GALT2, B4GALT4, B4GALT7, BIK, BPGM, BPNT1, CDK1, CENPA, CHPF2, CHST1, CHST12, CHST6, CLN6, COG2, COL5A1, COPB2, DDIT4, DEPDC1, DPYSL4, ECD EFNA3, EGLN3, EIF6, ENO1, ENO3, ERO1A, EXT2, FBP1, FKBP4, G6PC, G6PD, GAL3ST1, GALE, GALK1,GALK2,GAPDH,GFPT1,GLCE,GMPPA,GMPPB,GNPDA1,GNPDA2, GPC3, GPI, GYS1, HAX1, HDAC4,HDLBP, HK2, HK3, HKDC1, HMMR, HOMER1, HS2ST1, HSPA5, IDH3B, IDH3G,IDUA, KDELR3, KHK, KIF20A, KIF2A, MDH1, MDH2, ME1, ME2, MED24, MET, MIF, MIOX, MIR210, MLXIPL, MPI,NANP, NASP, NDC1, NDUFV3, NOL3, NSDHL, NUP107, NUP133, NUP153, NUP155, NUP160, NUP188, NUP205, NUP210, NUP214, NUP35, NUP37, NUP42, NUP43, NUP62, NUP85, NUP93, OGDH, OGT P4HA2, PAM,PAXIP1, PCK1, PCK2, PFKFB2, PFKFB4, PFKL, PFKM, PGK1, PGLS, PGM1, PGP, PHKA2,PKM,PLOD1, POLR3K, POM121,POM121C,PPFIA4, PPIA, PPP2CA, PPP2R1A, PPP2R5D, PRKAA2, PRKAG1, PRPS1, PSMC4, PYGB, RAE1, RARS1, RBCK1, RPE, RRAGD, SAP30, SDC2, SDHC, SEC13, SLC16A3, SLC25A10, SLC25A12, SOX9,SPAG4, SRD5A3, STC1, STC2, STMN1, TALDO1, TGFBI, TIGAR, TP53, TPI1, TPR, TREH, TSTA3, TXN, VCAN,VEGFA,XYLT2, ZBTB7A, ZNF292 | **YES** |
| **LUAD** | **Normal 59**  **Tumor 533** | AAAS, ABCB6,ADORA2B,AGL,AGRN,AK4, AKR1A1,ALDH1B1, ALDH3B2, ALDH7A1, ALDOA, ALDOC,ALG1, ANKZF1,ARTN, AURKA, B3GALT6, B3GAT1,B3GAT3, B3GNT3, B4GALT1, B4GALT2, B4GALT4,B4GALT7,BIK,BPGM,BPNT1, CAPN5, CASP6, CDK1,CENPA, CHPF, CHPF2,CLDN3, CLDN9, COG2,COL5A1,COPB2, CTH,DDIT4,DEPDC1,DHTKD1, DLAT,DLDDSC2,ECD, EFNA3,EGLN3,EIF6, ELF3, ENO1,ENO2, ENO3, ENTPD5, ERO1A,FAM162A, FH, FKBP4,FUT8,G6PD, GAL3ST1, GALE, GALK1, GALM,GAPDH, GAPDHS, GCKR,GCLC, GFPT1, GLCE,GMPPA, GMPPB,GNPDA1,GOT1, GOT2,GPC1, GPI,GPR87, GUSB, GYS1, HAX1,HDLBP, HIF1A,HKDC1,HMMR,HS2ST1, HS6ST2, HSPA5, IDH1, IDH2, IDH3B, IDH3G, IDUA, IER3, IGFBP3, ISG20, KDELR3, KHK,KIF20A, KIF2A, LCT, LDHA, LDHB, LHPP, MDH1,MDH2, ME1, ME2, MET, MIF, MIOX, MIR210,MPI, NANP, NASP, NDC1, NDUFV3, NOL3, NSDHL,NT5E, NUP107, NUP133, NUP153, NUP155, NUP160,NUP188, NUP205, NUP210, NUP35, NUP37, NUP42, NUP43,NUP50, NUP54, NUP62, NUP85, NUP88, NUP93,OGTP4HA1, PAM, PAXIP1, PC, PDHA1, PDHB, PDK3,PFKFB1, PFKFB4, PFKL, PFKP, PGAM1, PGAM4, PGK1,PGK2, PGLS, PGM2, PGM2L1, PGP, PHKA2, PKM,PKP2,PLOD1, PLOD2, PMM2, POLR3K, POM121, POM121C,PPARA,PPFIA4,PPIA,PPP2R1A,PPP2R1B,PPP2R5D,PRKAA1, PRKAA2, PRKAG1, PRPS1, PSMC4, PYGB, PYGL,QSOX1, RAE1,RRS1, RBCK1, RPE, SAP30, SDC1,SDHA, SDHB, SDHC,SEC13, SEH1L, SLC16A3,SLC25A10, SLC25A12, SLC25A13, SLC35A3,SLC37A4,SOD1, SOX9, SPAG4, SRD5A3, STMN1, SUCLG1,TALDO1,TGFA, TIGAR, TP53, TPBG, TPI1, TPR,TPST1, TSTA3, TXN,UGP2, VCAN, VEGFA, XYLT2,ZNF292 | **YES** |
| **LUSC** | **Normal 49**  **Tumor 502** | AAAS, ABCB6,ADH7,ADORA2B, AK4,ALDH3A1, ALDH3B2, ALDOA, ALDOC, ANKZF1, ARTN, AURKA, B3GAT3, B3GNT3, B4GALT2, B4GALT4, B4GALT7, BIK, CASP6, CDK1, CENPA, CHPF, CHPF2, CHST2, COL5A1, COPB2, DDIT4, DEPDC1, DHTKD1, DLD, DPYSL4, DSC2, EFNA3, EGFR, EGLN3, EIF6, ENO1, ENO2, ERO1A, EXT1, FAM162A, FH, FKBP4, FUT8, G6PD, GAPDH, GCLC, GMPPA, GNPDA1, GOT1, GOT2, GPC1, GPI, GPR87, GYS1, HAX1, HIF1A, HK2, HMMR, HS6ST2, HSPA5, IDH1, IDH2, IGFBP3, KDELR3, KIF20A, KIF2A, LDHA, LDHB, LDHC, MDH1, MDH2, ME1, MIF, MIOX, MIR210, MPI, NANP, NASP, NDC1, NOL3, NSDHL, NUP107, NUP155, NUP205, NUP210, NUP35, NUP37, NUP42, NUP43, NUP50, NUP62, NUP85, NUP88, NUP93, OGDHL, P4HA1, PAXIP1, PC, PDK3, PFKFB1, PFKFB2, PFKFB3, PFKFB4, PFKP, PGAM1, PGAM4, PGK1, PGK2, PGM1, PGM2, PGM2L1, PKM, PKP2, PLOD1, PLOD2, PMM2, POLR3K, PPFIA4, PPIA, PPP2CA, PPP2CB, PRKACA, PRKACB, PRKACG, PSMC4, PYGL, PYGM, RAE1, RARS1, RPE, SAP30, SDC1, SDHA, SDHC, SEH1L, SLC16A3, SLC25A10, SLC25A12, SLC25A13, SLC37A4, SOD1, SOX9, SPAG4, SRD5A3, STC2, STMN1, TALDO1, TGFA, TP53, TPBG, TPI1, TPST1, TREH, TSTA3, TXN, VCAN, XYLT2 | **YES** |