

Additional file 1 - Details of significant pathways by the Plink set-based test, GSEA or the combined analysis ($FDR < 0.2$).

Pathway	Method	Size	Overlap with PGDB	Overlap with CGC
Jak-STAT signaling pathway (hsa04630)	Plink set-based test	155	CCND1, IL10, IL12A, MYC	AKT1, AKT2, CBLB, CBLC, CCND1, CCND2, CCND3, CREBBP, CRLF2, EP300, IL2, IL21R, IL6ST, IL7R, JAK1, JAK2, JAK3, LIFR, MPL, MYC, PIK3CA, PIK3R1, PIM1, PTPN11, SOCS1
Chronic myeloid leukemia (hsa05220)	Plink set-based test	73	CCND1, CDKN1A, CDKN1B, CDKN2A, HRAS, MYC, RB1, TP53	ABL1, AKT1, AKT2, BCR, BRAF, CBLB, CBLC, CCND1, CDK4, CDK6, CDKN2A, HRAS, KRAS, MDM2, MYC, NRAS, PIK3CA, PIK3R1, PTPN11, RAF1, RB1, RUNX1, TP53
Small cell lung cancer (hsa05222)	Plink set-based test	84	BCL2, CCND1, CDKN1B, FHIT, MYC, PTEN, RARB, RB1, TP53	AKT1, AKT2, BCL2, BIRC3, CCND1, CCNE1, CDK4, CDK6, FHIT, MYC, PIK3CA, PIK3R1, PTEN, RB1, TP53
TGF-beta signaling pathway (hsa04350)	Plink set-based test	86	BMP6, MYC, TNF	BMPR1A, CREBBP, EP300, MYC, PPP2R1A
Endometrial cancer (hsa05213)	Plink set-based test	52	APC, CCND1, CDH1, CTNNA1, CTNNB1, EGFR, ERBB2, HRAS, MYC, PTEN, TP53	AKT1, AKT2, APC, BRAF, CCND1, CDH1, CTNNB1, EGFR, ERBB2, HRAS, KRAS, MLH1, MYC, NRAS, PIK3CA, PIK3R1, PTEN, RAF1, TCF7L2, TP53
Thyroid cancer (hsa05216)	Plink set-based test	29	CCND1, CDH1, CTNNB1, HRAS, MYC, NCOA4, NTRK1, TP53	BRAF, CCND1, CDH1, CTNNB1, HRAS, KRAS, MYC, NCOA4, NRAS, NTRK1, PAX8, PPARG, RET, TCF7L2, TFG, TP53, TPM3, TPR
Bladder cancer (hsa05219)	Plink set-based test	42	CCND1, CDH1, CDKN1A, CDKN2A,	BRAF, CCND1, CDH1, CDK4, CDKN2A, EGFR, ERBB2, FGFR3, HRAS, KRAS, MDM2, MYC, NRAS, RAF1, RB1, TP53

			<i>DAPK1, EGFR, ERBB2, HRAS, IL8, MYC, RASSF1, RB1, TP53</i>	
Acute myeloid leukemia (hsa05221)	Plink set-based test	60	<i>CCND1, HRAS, MYC</i>	<i>AKT1, AKT2, BRAF, CCND1, CEBPA, FLT3, HRAS, KIT, KRAS, MYC, NRAS, PIK3CA, PIK3R1, PIM1, PML, RAF1, RARA, RUNX1, TCF7L2</i>
Cell cycle (hsa04110)	Plink set-based test	128	<i>ATM, CCND1, CDKN1A, CDKN1B, CDKN2A, MAD1L1, MYC, RB1, TP53</i>	<i>ABL1, ATM, BUB1B, CCND1, CCND2, CCND3, CCNE1, CDK4, CDK6, CDKN2A, CDKN2C, CHEK2, CREBBP, EP300, MDM2, MYC, RB1, TP53</i>
Wnt signaling pathway (hsa04310)	Plink set-based test	151	<i>APC, BTRC, CCND1, CTNNB1, MYC, TP53, VANGL2</i>	<i>APC, CCND1, CCND2, CCND3, CREBBP, CTNNB1, EP300, JUN, MYC, PPP2R1A, TCF7L2, TP53, WIF1</i>
Fc gamma R-mediated phagocytosis (hsa04666)	Plink set-based test & GSEA	97	NA	<i>AKT1, AKT2, FCGR2B, PIK3CA, PIK3R1, RAF1, SYK, WAS</i>
Regulation of actin cytoskeleton (hsa04810)	Plink set-based test & GSEA	216	<i>APC, EGFR, HRAS</i>	<i>APC, ARHGEF12, BRAF, EGFR, FGFR1, FGFR2, FGFR3, HRAS, KRAS, MSN, MYH9, NRAS, PDGFB, PDGFRA, PDGFRB, PIK3CA, PIK3R1, RAF1, WAS</i>
Colorectal cancer (hsa05210)	Plink set-based test	62	<i>APC, BCL2, CCND1, CTNNB1, MSH2, MYC, TP53</i>	<i>AKT1, AKT2, APC, BCL2, BRAF, CCND1, CTNNB1, JUN, KRAS, MLH1, MSH2, MSH6, MYC, PIK3CA, PIK3R1, RAF1, RALGDS, TCF7L2, TP53</i>
ErbB signaling pathway (hsa04012)	Plink set-based test	87	<i>CDKN1A, CDKN1B, EGFR, ERBB2, HRAS, MAP2K4, MYC</i>	<i>ABL1, ABL2, AKT1, AKT2, BRAF, CBLB, CBLC, EGFR, ERBB2, HRAS, JUN, KRAS, MAP2K4, MYC, NRAS, PIK3CA, PIK3R1, RAF1</i>
Focal adhesion (hsa04510)	GSEA	201	<i>BCL2, CAV1, CCND1, CTNNB1,</i>	<i>AKT1, AKT2, BCL2, BIRC3, BRAF, CCND1, CCND2, CCND3, COL1A1, CTNNB1, EGFR, ERBB2, HRAS, JUN, KDR, MET, PDGFB, PDGFRA,</i>

			<i>EGFR, ERBB2, HRAS, PTEN</i>	<i>PDGFRB, PIK3CA, PIK3R1, PTEN, RAF1</i>
Dilated cardiomyopathy (hsa05414)	GSEA	92	<i>TNF</i>	<i>GNAS, TPM3, TPM4</i>
Hypertrophic cardiomyopathy (HCM) (hsa05410)	GSEA	85	<i>TNF</i>	<i>TPM3, TPM4</i>
Arrhythmogenic right ventricular cardiomyopathy (ARVC) (hsa05412)	GSEA	76	<i>CTNNA1, CTNNB1</i>	<i>CTNNB1, TCF7L2</i>
Leukocyte transendothelial migration (hsa04670)	GSEA	118	<i>CTNNB1, CTNNA1</i>	<i>CTNNB1, PIK3CA, ITK, PTPN11, MSN, PIK3R1, MLLT4</i>
Axon guidance (hsa04360)	Combined	129	<i>HRAS</i>	<i>ABL1, ARHGEF12, HRAS, KRAS, MET, NRAS, SRGAP3</i>