



Supplementary materials

Analysis of miR-9-5p, miR-124-3p, miR-21-5p, miR-138-5p, and miR-1-3p in Glioblastoma Cell Lines and Extracellular Vesicles

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Supplementary Table 1. The list of common genes between datasets.

	Target genes
MiR-9-5p	ONECUT2, YBX3, LYVE1, POU2F1, SLC50A1, TRPM7, AP1S2, PDK4, LDLRAP1, KCNJ2, SGMS2, MTHFD2, FRMD6, FSTL1, RIC3, LIN28B, PRDM6, RAB34, SLC31A2, ANK2, SFXN2, CLDN14, C2orf88, CXCL11, SOCS5, VAV3, RANBP17, MAGT1, CCNDBP1, GALNT3, GABRB2, CAPZA1, TNC, SLC10A3, TESK2, POU2F2, CCNG1, IPO4, SCRIB, TNFAIP8, RNF150, NID2, NXPE3, CALB2, FOXN2, MDGA2, KLF5, LEP, DYRK1B, MAEA, PCGF6, ENPEP, SMARCD2, EMB, ARMCX2, MYOCD, UBE3C, FYTTD1, YPEL2, MTMR2, SHC2, PIRT, FOXP4, MYH1, TRIM71, CMTR2, AP3B1, DOK6, C21orf91, ANO1, CCDC43, FAM19A5, KCNMB2, PRDM1, PI4K2A, LURAP1L, EIF4E3, TOMM20, DLX3, SEC23IP, NTNG1, SNX7, PRRX1, WASP2, ANP32B, NR5A2, GPR137C, ITGB4, CPEB2, ARID3B, GDNF, TMEM109, TBPL1, SUDS3, CCAR2, GCH1, GOT1, CCDC138, SIRT1, MAP3K2, OGDHL, GRHL1, RASSF3, DIXDC1, C1QL1, ALCAM, SPECC1L, VRTN, ALAD, M6PR, IGFBP3, PTAR1, PRPS2, EHD4, ITM2C, PALMD, DNAJC14, ZC3H12A, KCTD12, PCSK2, NAP1L1, CDK8, ZKSCAN1, DDHD2, COL15A1, RAB27B, DSE, INHBB, PAK4, IGF2BP2, SHC1, CSGALNACT1, SLC8A1, CHST15, ATL2, COL27A1, RHOJ, PANK3,

	CSNK1A1, IGF2BP3, ULK2, GMEB2, NEDD4, ZBED3, TRERF1, FAM13C, MAN1A2, TCF7, PBRM1, DIAPH2, CA7, P4HA2, BAG4, ENTPD5, STMN1, HLTF, VANGL1, ZNF354A, FGF5, POU2F3, LZTS2, LIN28A, RAB8A, UBE2Z, PARG, TMEM87B, KCNK4, CRYBG3, GZF1, FAM19A4, UHMK1, SMAP2, KLHL1, COL9A1, ITPRIPL2, GJA3, TGFBR2, CNTFR, HOXA11, MYO1C, TSC22D2, SRSF10, SYAP1, RNF111, SLC25A24, FREM2, ARHGAP24, ANKRD13A, ZBTB39, RNF19A, FBXL2, ERG, MAP3K3, SLC39A9, ESYT1, MYPN, OTUD3, ARID1A, RNF128, CCNE2, MAP2K7, DHX40, OTUD7B, CPEB4, ELOVL4, KLHL42, FAM117A, ZBTB41, VAT1, CRIM1, SHISA2, CCSER2, TTYH2, ZIC5, RNF24, AP4E1, PXDN, HUNK, KLHL18, LDLRAD3, ITPKC, VGLL4, FAM199X, EFEMP1, UBASH3B, SLC26A2, CLCA2, STAM, DNAJC3, TBC1D8, UTRN, NPY2R, C18orf25, BCL2L11, SLC9A1, NHLH2, TBC1D4, TES, COG3, FOXG1, MBNL1, ZC3H10, SLC39A14, GSKIP, HK2, ARHGEF2, EIF5A2, KIAA2013, BAHD1, ZNF365, STEAP3, ASB7, PPM1F, NID1, ATOH8, LPP, FAF2, NHSL1, SIK1, ZNF395, TLK1, TBC1D22A, PIK3R3, PLBD2, ADAMTS3, CLOCK, PEX5L, TMEM170B, CPEB3, FBXW2, DPF3, MRFAP1, KIF13A, SCYL3, RBMS3, EN1, SLC18A2, ITIH6, RYBP, MDGA1, BCL6, PTCHD1, ALPL, CNOT7, FBXL3, MMP16, PPP6R3, CNOT6L, CXCR4, LZTS3, RPP14, MARCH6, FGF9, PPIP5K1, PIGZ, AEFP2, IPO13, COLEC12, MIER3, SLC6A6, HSP90AA1, NUTF2, HLCS, PTMA, SH2B3, TAF4B, CMTM6, PYGO2, STAC, STK38L, ANXA2, BTBD10, NCOA7, PHTF2, REEP3, SPTSSA, SLC5A3, VAMP3, CNNM2, CREBRF, CNTN4, SERINC5, TSNAX, KIF1C, DRD2, MAP3K1, PIGM, EPHB4, HES1, PHF8, BEND4, NR2E1, EDEM3, SLAIN2, CAMKK2, RAP1B, SDC2, SH3PXD2B, SRSF1, STT3B, PIK3CB, ARHGEF17, C16orf70, IFFO2, DBNL, MLLT3, AR, C5orf24, TRAM1, AMBRA1, SLC19A2, AMMECR1, CHMP2B, ELMOD2, S100PBP, STARD13, ARL4C, FOXP1, BNC2, GREB1, SMOC2, WIZ, DGKH, AP1S3, RBMS1, CEP104, MAP1A, ATF2, OPCML, EN2, SGSM1, HS3ST3B1, ST8SIA4, ADPGK, BICC1, SACS, PHIP, SORT1, UBE2Q1, NMT2, CC2D1B, TULP4, ENTPD1, MTHFD1L, EFNA1, RASGRF2, COL18A1, SNRK, CUL4A, UBE2H, SLC25A36, NMT1, MME, LARP1, PHF20L1, SPTLC2, ARID1B, TMEM248, NEK1, SLC9A7, BACE1, TNFRSF21, ADAMTS5, SDC1, PPP2R2A, MBTPS1, FAM8A1, KIAA1217, WDTC1, GAD1, SHROOM3, MYH9, RBM24, GOPC, HIPK1, GSK3B, GPBP1L1, SLC27A4, TMTC1, ADCY5, SBNO1, KIAA1549, CNNM1, ETS1, SOS1, FAM155B, SNAP23, SPTSSB, RALGDS, RNF169, CBLN4, CCDC126, SIX4, LSM14A, PRRT3, ITGA6, FXR1, RUNDC3B, DGCR8, FBRS, CPEB1, ARFGEF2, DIO2, MYLK, ARFGEF1, RCOR1, LMX1A, GPRASP2, IKZF5, OXSR1, SYT4, ZBTB34, MAP1B, PLEKHA1, TXNDC5, GRIK3, FAM118A, TSPAN9, PAK6, EPHA7, RC3H1, CBFA2T2, PEAK1, PPIP5K2, ELAVL1, SYNJ1, ARNTL2, ATXN3, DIAPH1, AJUBA, HIPK3, FAM117B, RHOBTB1, ZNF236, FAM43B, SYNJ2BP, SRCAP, PEG3, BEND3, FBXL16, FRYL, RSPLY1, NFIC, GCLM, ANKH, AATK, KDM5A, ATP8B2, CC2D1A, CBX5, KPNB1, PHF13, SHROOM4, ZNF367, FRMD4A, RORA, ATP7A, VDAC3, WARS2, ASXL3, NCOA3, MAPKAPK2, HECTD1, KIAA0930, FBN2, INSIG1, DENND3, SLC30A5, KLHDC10, UHRF1BP1, CCNT1, PPARA, FMR1, SRF, NCOR2, FSD1L, HIPK2, ZNF362, SLC1A1, SAMD8, SPAG9, VCAN, PTBP3, C5orf30, SMARCE1, CHSY1, UNC80, PAX5, PCDH7, RANBP2, FYCO1, ANKRD52, UBR5, PTEN, ZFHX4, FOXO1, EIF5, SNTB2, UBFD1, BAZ2B, NFATC3, KIF13B, SHB, KCNQ3, ID4, LIFR, PCGF5, SSX2IP, TRAF3, ARCN1, ADAM10, CREB5, ANKRD12, GPC6, AMER1, UBN1, CLCN4, VCL, LMBRD2, FLRT3, PLAG1, TNS1, TENM1, PRLR, CHMP1B, PCDH10, MGA, CTDSP2, EVI5, PSD3, PHLDB1, FAM126B, ADCY9, SZRD1, UACA, FOXRED2, SHROOM2, PITPNM2, ABL2, UNC13A, TMEM164, NFASC, CDC73, AMOTL2, ESRRB, CCDC50, MTF2, KCNA1, CCDC6, CLCN5, ICMT, AMOTL1, GPATCH8, LIN7A, ATP1B1, CCDC88A, ZBTB44, PAK3, PKIB, SYT1, RAB5B, UNC5D, CEP170B, ATG14,
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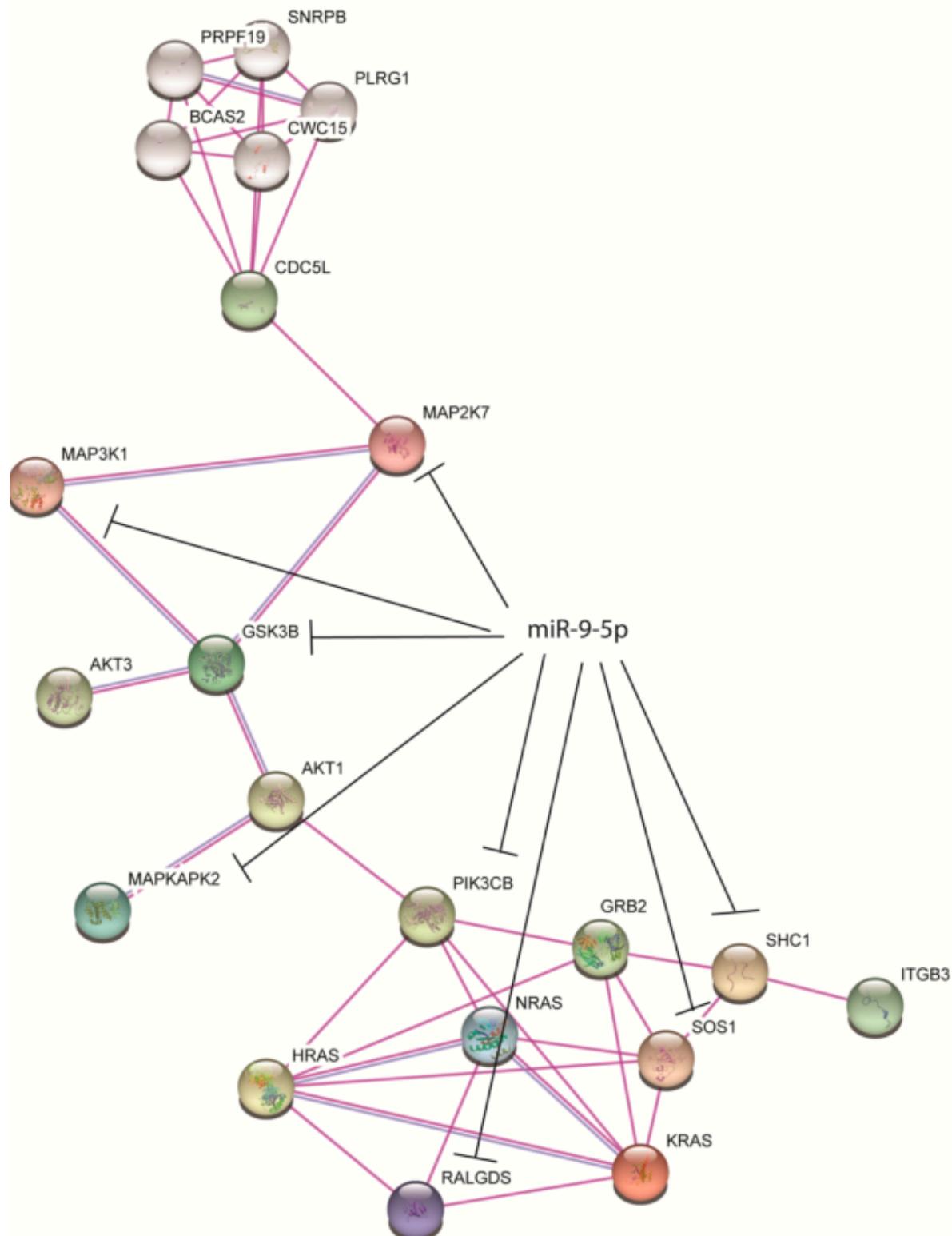
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miR-21-5p	KRIT1, IL12A, FASLG, FGF18, CCL1, PLEKHA1, RSAD2, YOD1, PELI1, TGFBI, ARMCX1, MATN2, SKP2, NTF3, TIMP3, SMAD7, SATB1, FAM13A, RP2, RTN4, ARHGAP24, UBE2D3, LRRK57, DUSP8, PDCD4, SOX5, RMND5A, OLR1, SPRY1, S100A10, RALGPS2, GLIS2, KLF5, SPRY2, ELF2, RECK, PCBP1, SLC16A10, ST3GAL6, KBTBD6, PPP1R3A, SKI, STAG2, CD69, CPEB3, PCSK6, SESN1, BCL7A, GLCCI1, GABRB2, LANCL1, ST6GAL1, ASF1A, PBRM1, JAG1, CHIC1, TMEM170A, DCAF7, HIPK3, TIAM1, MAP3K1, CASKIN1, RBPJ, NFIB, PLAG1, ACVR1C, THR8, CSRNP3, STAT3, ZSWIM6, RASA2, PAG1, KLHL42, ADNP, NFIA, PIK3R1, ZNF704, FRS2, VASH2, NIPAL1, LIFR, KLF6, CADM2, GATA2B, FGD4, MSX1, SMARCD1, MIA3, CBX4, TAGAP, FBXO28, EPHA4, NEGR1, VCL, KLHL15, BTG2, TESK2, COL4A1, CDC25A, AKIRIN1, CCL20, PIKFYVE, ANKRD46, TET1, PDZD2, AGO4, IL6R, GPC4, HGF, ALX4, BMPR2, MTMR12, KLF3, RASGRP1, SCML2, BNC2, SOX7, SLC30A10, GAB1, CREBRF, PURB, CNOT6, MEF2C, RBMS3, SUZ12, EHD1, ACVR2A, MPRIP, PAIP2B, BCL11B, STRN, UNC80, TNRC6B, HNRNPU, KLF12, GID4, PRPF4B, YAP1, GTPBP10, RAB11A, NFAT5
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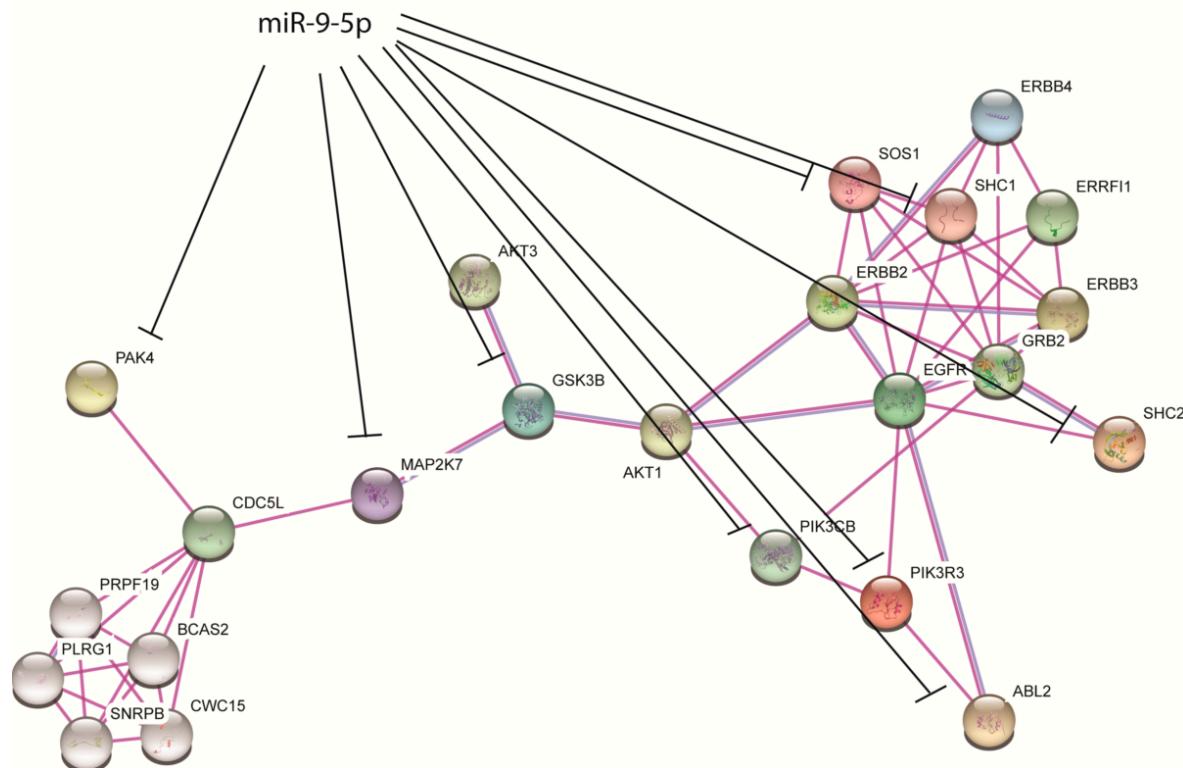
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miR-9-5p target genes involved in RAS pathway



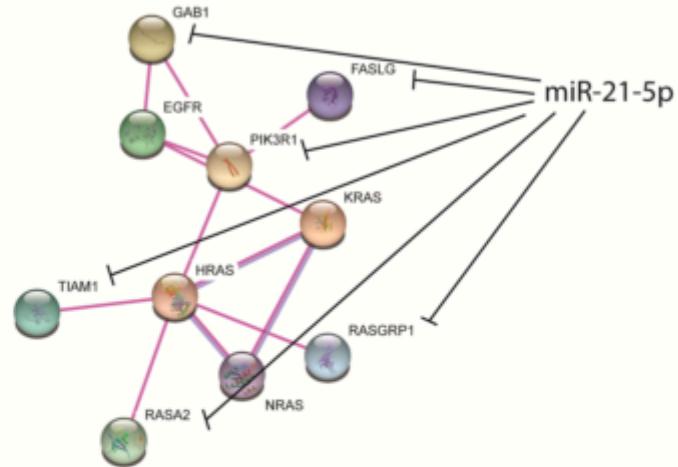
Supplementary Figure 1. Interconnections of proteins involved in the RAS pathway and regulated by miR-9-5p.

miR-9-5p target genes involved in ErbB pathway

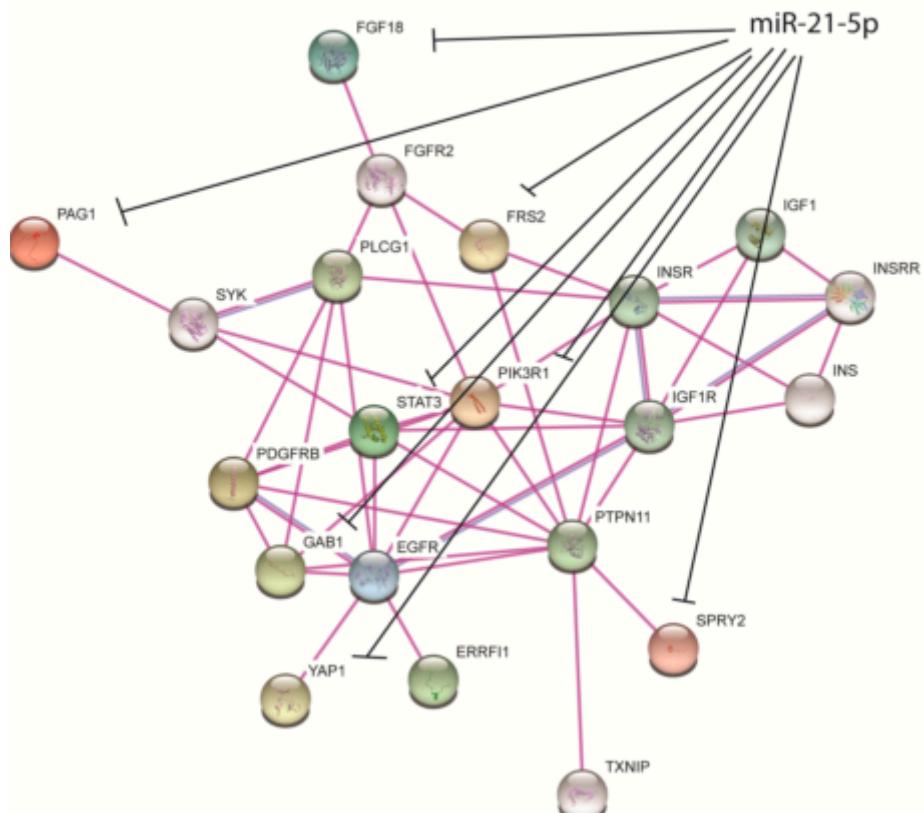


Supplementary Figure 2. Interconnections of proteins involved in the ErbB pathway and regulated by miR-9-5p.

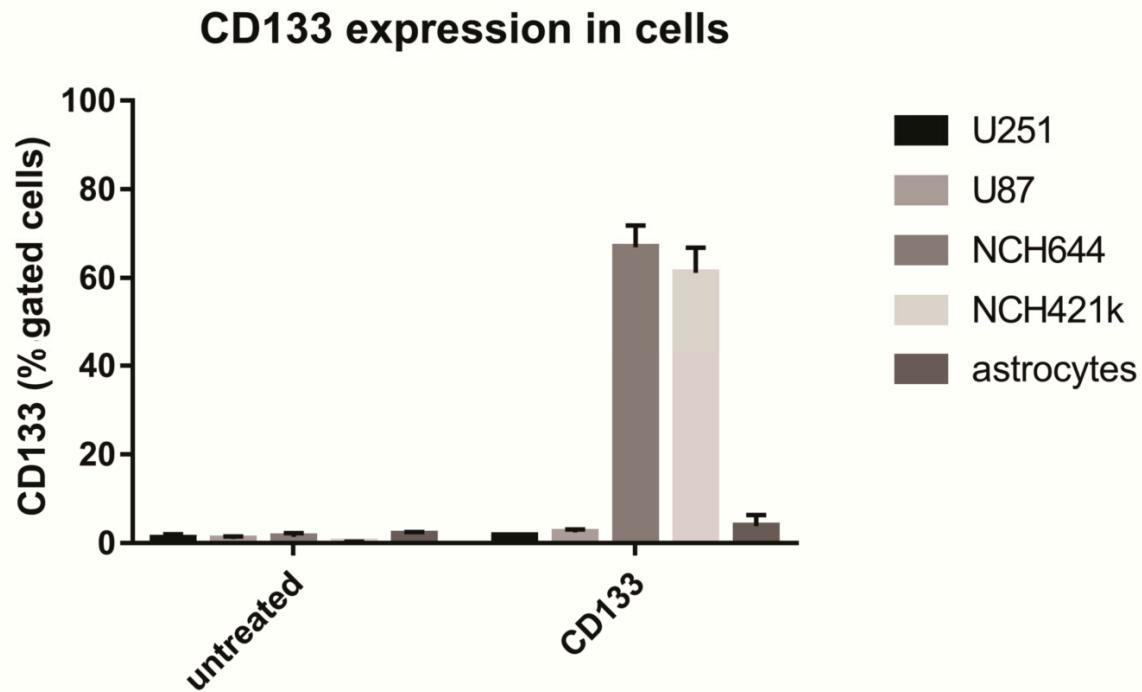
miR-21-5p target genes involved in RAS pathway



miR-21-5p target genes involved in tyrosine kinase pathway



Supplementary Figure 3. The involvement of miR-21-5p in the RAS and tyrosine kinase pathway.



Supplementary Figure 4. Expression of CD133 on the surface of glioblastoma cell lines.