

## Supplemental Material

**Supplemental Table 1.** List of the most enriched KEGG pathways according to *in silico* analysis of predicted targets of miRNAs associated with clinical parameters in failing heart with/without LVAD support.

KEGG pathway	p value	n° miRNAs	n° target genes (% in the pathway)	candidate target genes
				FZD7; WNT16; FZD5; TGFBR1; APC; CRK; WNT5A; HHIP; COL4A5; PIK3R5; ETS1; RALA; WNT3; IGF1R; FGF20; WNT5B; CDK6; MST1; EPAS1; MITF; PTK2; CBLB;
Pathways in cancer	2.95E-09	9	49 (15.0%)	ITGAV; CDH1; FZD10; PDGFB; KIT; VEGFC; COL4A3; PIK3R1; COL4A4; FGF9; KITLG; RAC1; FGF18; BMP2; MAX; LAMC1; IGF1; CASP8; LEF1; COL4A6; LAMA2; STAT1; PTEN; FOXO1; TGFBR2; TFG; COL4A1
Regulation of actin cytoskeleton	1.44E-04	9	29 (13.5%)	WASL; ITGB8; APC; CRK; MYL12B; PIK3R5; ROCK2; MYH10; GNG12; TMSB4Y; MYLK2; FGF20; ITGA1; RRAS2; PTK2; ITGAV; PIKFYVE; NCKAP1L; PDGFB; CFL2; PIK3R1; FGF9; RAC1; FGF18; MYL7; PDGFC; MYLK3; NCKAP1; DIAPH2
Focal adhesion	1.37E-16	8	40 (19.3%)	ITGB8; CRK; THBS1; MYL12B; COL4A5; PIK3R5; RAP1A; COL27A1; ROCK2; IGF1R; MYLK2; CAV2; ITGA1; COL3A1; PTK2; ITGAV; COL2A1; COL5A1; PDGFB; COL1A1; VEGFC; COL4A3; PIK3R1;

				COL4A4; RAC1; MYL7; COL1A2; LAMC1; IGF1; PDGFC; MYLK3; COL11A1; COL6A3; COL4A6; LAMA2; COL5A3; PTEN; COL5A2; ARHGAP5; COL4A1
PI3K-Akt signaling pathway	1.15E-11	8	50 (14.4%)	PRLR; ITGB8; THBS1; CREB5; COL4A5; PIK3R5; COL27A1; GNG12; STK11; IGF1R; FGF20; PPP2R5C; ITGA1; CDK6; COL3A1; IL7R; EFNA5; GHR; PTK2; ITGAV; COL2A1; TSC2; JAK2; EIF4E; COL5A1; PDGFB; COL1A1; KIT; VEGFC; COL4A3; PIK3R1; COL4A4; FGF9; KITLG; RAC1; FGF18; COL1A2; LAMC1; IGF1; PDGFC; COL11A1; COL6A3; COL4A6; FOXO3; LAMA2; COL5A3; PTEN; COL5A2; RPS6KB1; COL4A1
Transcriptional misregulation in cancer	4.27E-07	8	30 (16.8%)	CCNT2; WNT16; LMO2; ELK4; HMGA2; AFF1; MLLT3; IGF1R; PRCC; UTY; PTK2; ATM; CEBPB; MLF1; NR4A3; KLF3; BMP2K; PDGFB; JMJD1C; ETV1; CDK14; MAX; DOT1L; IGF1; MYCN; MEF2C; SIX4; FOXO1; SMAD1; TGFBR2
mTOR signaling pathway	9.89E-06	8	13 (21.7%)	PIK3R5; STK11; RPS6KA1; RICTOR; AKT1S1; TSC2; EIF4E; VEGFC; PIK3R1; IGF1; PTEN; ULK2; RPS6KB1
Axon guidance	4.22E-05	8	20 (15.7%)	SEMA5A; EPHA5; ROCK2; NTN1; SEMA4F; EFNA5; NCK1; PTK2; RASA1; UNC5A; NFAT5; SRGAP3; NCK2; DPYSL5; CFL2;

				SEMA3D; RAC1; ROBO1; SEMA6D; GNAI1
Dilated cardiomyopathy	5.46E-05	8	15 (16.7%)	DES; ITGB8; TPM1; ADCY2; CACNB4; SGCD; ITGA1; ITGAV; DMD; PLN; SLC8A1; IGF1; LAMA2; CACNA2D1; ATP2A2
Wnt signaling pathway	6.04E-05	8	20 (14.4%)	FZD7; WNT16; FZD5; LRP6; TBL1X; BTRC; APC; WNT5A; PORCN; ROCK2; WNT3; PPP2R5C; WNT5B; CAMK2A; NFAT5; GPC4; FZD10; RAC1; SIAH1; LEF1
Hypertrophic cardiomyopathy (HCM)	7.65E-05	8	14 (16.9%)	DES; ITGB8; TPM1; CACNB4; SGCD; ITGA1; ITGAV; DMD; SLC8A1; PRKAB2; IGF1; LAMA2; CACNA2D1; ATP2A2
Arrhythmogenic right ventricular cardiomyopathy	1.77E-03	8	13 (17.6%)	DES; ITGB8; CACNB4; SGCD; ITGA1; ITGAV; DMD; SLC8A1; DSG2; LEF1; LAMA2; CACNA2D1; ATP2A2
Endocytosis	7.59E-03	8	23 (11.3%)	TGFBR1; SMAD6; STAM; IQSEC3; WWP1; PDCD6IP; AP2B1; SMURF2; CHMP1B; IGF1R; CAV2; CBLB; PSD3; RAB11FIP2; RAB11A; KIT; RAB11FIP5; HGS; HSPA8; VPS37C; TGFBR2; PIP5KL1; ASAP2
Leukocyte transendothelial migration	1.05E-02	8	15 (12.7%)	CTNND1; CLDN8; MYL12B; PIK3R5; RAP1A; ROCK2; CLDN16; PTK2; PIK3R1; RAC1; MYL7; CLDN1; CDH5; ARHGAP5; GNAI1
Neurotrophin signaling pathway	2.10E-02	8	15 (12.5%)	NTF3; CAMK4; CALM3; CRK; PIK3R5; RAP1A; NTRK3; RPS6KA1; CAMK2A; KIDINS220; PIK3R1; RAC1; GAB1; FOXO3; IRAK1

Salivary secretion	3.61E-02	8	11 (12.2%)	ADCY2; CALM3; ATP1B1; ATP2B1; ATP1B3; RYR3; GNAQ; GUCY1A2; PRKG1; ATP1A1; ITPR2
ECM-receptor interaction	3.21E-53	7	23 (26.4%)	ITGB8; SV2B; THBS1; COL4A5; COL27A1; ITGA1; COL3A1; ITGAV; COL2A1; COL5A1; COL1A1; COL4A3; COL4A4; COL1A2; LAMC1; COL11A1; COL6A3; COL4A6; LAMA2; COL5A3; COL5A2; CD47; COL4A1
MAPK signaling pathway	1.39E-06	7	36 (14.0%)	NTF3; CACNA1A; TGFBR1; RASA2; ELK4; CRK; CACNB4; RAP1A; GNG12; MAP4K3; MAP4K4; RPS6KA1; FGF20; TAB2; MAP3K11; RRAS2; MST1; TAOK1; CACNA1I; DUSP10; RASA1; MAP3K12; RASGRP1; PPM1A; PDGFB; FGF9; RAC1; FGF18; HSPA8; NF1; MAX; TNFRSF1A; MAP3K2; CACNA2D1; MEF2C; TGFBR2
Melanoma	1.48E-04	7	13 (18.3%)	PIK3R5; IGF1R; FGF20; CDK6; MITF; CDH1; PDGFB; PIK3R1; FGF9; FGF18; IGF1; PDGFC; PTEN
Pancreatic secretion	3.25E-03	7	13 (13.5%)	ADCY2; TRPC1; RAP1A; SLC4A4; ATP1B1; ATP2B1; ATP1B3; RAB11A; RAC1; GNAQ; ATP2A2; ATP1A1; ITPR2
mRNA surveillance pathway	5.01E-03	7	12 (13.2%)	MSI2; CPSF7; PAPOLG; PABPC4; PPP2R5C; NXF1; PABPC1L; PABPC4L; SMG1; FIP1L1; ACIN1; GSPT1
Cytokine-cytokine receptor interaction	5.73E-03	7	24 (9.1%)	PRLR; TGFBR1; INHBB; CXCL5; TNFRSF1B; IL7R; CCL11; GHR; CCL7; LIFR; PDGFB;

				KIT; VEGFC; ACVR2A; KITLG; BMP2; PDGFC; BMPR1A; TNFRSF1A; IL6ST; IL11RA; TNFRSF9; TGFBR2; BMPR2
Gastric acid secretion	7.52E-03	7	11 (14.7%)	ADCY2; CALM3; ATP1B1; MYLK2; CAMK2A; ATP1B3; GNAQ; MYLK3; ATP1A1; ITPR2; GNAI1
Bile secretion	7.52E-03	7	10 (13.9%)	ADCY2; AQP9; SLC4A4; ATP1B1; AQP4; ATP1B3; ABCC3; SLC22A7; ATP1A1; SCARB1
ErbB signaling pathway	1.19E-02	7	13 (14.9%)	HBEGF; NRG4; CRK; PIK3R5; CAMK2A; NCK1; PTK2; CBLB; NCK2; PIK3R1; GAB1; ABL2; RPS6KB1
Ubiquitin mediated proteolysis	1.25E-02	7	17 (12.4%)	BTRC; FBXW7; TRIM37; UBR5; WWP1; SMURF2; UBE4A; RHOBTB1; HERC3; CBLB; CUL5; UBE2A; UBE2Q1; SIAH1; ERCC8; KLHL9; UBE2W
Bacterial invasion of epithelial cells	1.41E-02	7	10 (13.2%)	WASL; CRK; PIK3R5; CAV2; PTK2; CBLB; CDH1; PIK3R1; RAC1; GAB1
Viral myocarditis	4.73E-02	7	9 (15%)	CXADR; MYH10; SGCD; DMD; RAC1; MYH15; CASP8; LAMA2; ABL2
Protein digestion and absorption	1.37E-16	6	24 (27.0%)	COL4A5; ELN; COL27A1; COL7A1; ATP1B1; COL3A1; COL9A1; COL2A1; COL15A1; ATP1B3; SLC7A7; COL5A1; COL1A1; SLC8A1; COL4A3; COL4A4; COL1A2; COL11A1; COL6A3; COL4A6; ATP1A1; COL5A3; COL5A2; COL4A1
TGF-beta signaling	9.21E-06	6	16 (20.0%)	TGFBR1; SMAD6; INHBB; THBS1; SMURF2;

pathway				ROCK2; DCN; ACVR2A; BMP2; TFD1; BMPR1A; LTBP1; SMAD1; TGFBR2; BMPR2; RPS6KB1
Small cell lung cancer	2.65E-05	6	15 (17.4%)	COL4A5; PIK3R5; CDK6; APAF1; PTK2; ITGAV; COL4A3; PIK3R1; COL4A4; MAX; LAMC1; COL4A6; LAMA2; PTEN; COL4A1
Melanogenesis	2.15E-04	6	16 (15.8%)	FZD7; WNT16; FZD5; ADCY2; CALM3; WNT5A; WNT3; WNT5B; MITF; CAMK2A; FZD10; KIT; KITLG; GNAQ; LEF1; GNAI1
Adherens junction	4.53E-04	6	11 (15.1%)	TGFBR1; WASL; CTNND1; SORBS1; IGF1R; CDH1; FER; RAC1; LEF1; PVRL3; TGFBR2
Lysine degradation	3.25E-03	6	7 (13.7%)	SETDB2; SETD2; NSD1; ASH1L; DOT1L; SUV420H2; MLL3
Endocrine and other factor-regulated calcium reabsorption	9.63E-03	6	8 (16.7%)	AP2B1; ATP1B1; ATP2B1; ATP1B3; RAB11A; SLC8A1; GNAQ; ATP1A1
RNA degradation	2.28E-02	6	10 (13.5%)	CNOT6; CNOT4; SKIV2L2; PABPC4; C1D; PAN2; PABPC1L; PABPC4L; CNOT3; DHX36
Amoebiasis	8.37E-14	5	21 (19.3%)	COL4A5; PIK3R5; COL27A1; SERPINB9; COL3A1; PTK2; COL2A1; COL5A1; COL1A1; COL4A3; PIK3R1; COL4A4; COL1A2; LAMC1; GNAQ; COL11A1; COL4A6; LAMA2; COL5A3; COL5A2; COL4A1
Basal cell carcinoma	1.25E-04	5	11 (20.0%)	FZD7; WNT16; FZD5; APC; WNT5A; HHIP; WNT3; WNT5B; FZD10; BMP2; LEF1

p53 signaling pathway	2.03E-04	5	12 (17.6%)	THBS1; CDK6; APAF1; ATM; TSC2; SIAH1; MDM4; IGF1; CASP8; PTEN; CCNG2; PPM1D
Phosphatidylinositol signaling system	3.51E-03	5	12 (14.8%)	CALM3; PIK3R5; PIKFYVE; INPP4A; PIK3R1; DGKB; OCRL; INPP5A; DGKD; PTEN; ITPR2; DGKH
Hedgehog signaling pathway	1.13E-02	5	8 (15.7%)	WNT16; BTRC; WNT5A; HHIP; WNT3; RAB23; WNT5B; BMP2
Aldosterone-regulated sodium reabsorption	3.47E-02	5	6 (15.4%)	PIK3R5; ATP1B1; ATP1B3; PIK3R1; IGF1; ATP1A1
Renal cell carcinoma	3.54E-02	5	10 (15.2%)	CRK; PIK3R5; RAP1A; ETS1; EPAS1; PDGFB; VEGFC; PIK3R1; RAC1; GAB1
Pancreatic cancer	4.73E-02	5	9 (13.6%)	TGFBR1; PIK3R5; RALA; CDK6; VEGFC; PIK3R1; RAC1; STAT1; TGFBR2
Mineral absorption	4.22E-05	4	11 (21.6%)	ATP7A; ATP1B1; ATP2B1; ATP1B3; STEAP2; SLC11A2; SLC8A1; ATP1A1; CYBRD1; SLC46A1; SLC30A1