

# Analysis of microRNAs in exosomes of breast cancer patients in search of molecular prognostic factors in brain metastases

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## Supplementary material

**Table S1** miRNAs used in TaqMan Advanced miRNA Array Cards. Next to the miR name is the assay number (Thermo Fisher Scientific).

miRNAs
hsa-miR-122-5p-477855_mir
hsa-miR-125a-3p-477883_mir
hsa-miR-130a-3p-477851_mir
hsa-miR-132-3p-477900_mir
hsa-miR-143-3p-477912_mir
hsa-miR-148a-3p-477814_mir
hsa-miR-148b-3p-477824_mir
hsa-miR-150-5p-477918_mir
hsa-miR-17-5p-478447_mir
hsa-miR-181a-5p-477857_mir
hsa-miR-181b-5p-478583_mir
hsa-miR-185-5p-477939_mir
hsa-miR-193a-5p-477954_mir
hsa-miR-197-3p-477959_mir
hsa-miR-199a-3p-477961_mir
hsa-miR-20a-5p-478586_mir
hsa-miR-210-3p-477970_mir
hsa-miR-214-3p-477974_mir
hsa-miR-21-5p-477975_mir
hsa-miR-222-3p-477982_mir
hsa-miR-223-3p-477983_mir
hsa-miR-23a-3p-478532_mir
hsa-miR-24-3p-477992_mir
hsa-miR-26a-5p-477995_mir
hsa-miR-27a-3p-478384_mir
hsa-miR-296-5p-477836_mir
hsa-miR-29a-3p-478587_mir
hsa-miR-320a-478594_mir
hsa-miR-32-5p-478026_mir
hsa-miR-326-478027_mir
hsa-miR-340-5p-478042_mir

hsa-miR-342-3p-478043\_mir  
 hsa-miR-410-3p-478085\_mir  
 hsa-miR-425-5p-478094\_mir  
 hsa-miR-483-5p-478432\_mir  
 hsa-miR-484-478308\_mir  
 hsa-miR-485-3p-478125\_mir  
 hsa-miR-486-5p-478128\_mir  
 hsa-miR-490-3p-478131\_mir  
 hsa-miR-491-5p-478132\_mir  
 hsa-miR-548d-5p-480870\_mir  
 hsa-miR-576-3p-478164\_mir  
 hsa-miR-598-3p-478172\_mir  
 hsa-miR-625-5p-479469\_mir  
 hsa-miR-652-3p-478189\_mir  
 hsa-miR-885-5p-478207\_mir  
 hsa-miR-92b-3p-477823\_mir  
 hsa-miR-96-5p-478215\_mir

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**Supplementary Table S2:** miRNAs and associated targets, signaling pathways and associated diseases (italics: indirect connection, bold: direct connection).

	<b>Main target genes (TargetScan)</b>	<b>Related KEGG pathway</b>	<b>HMDD v3.2</b>
<b>hsa-miR-122-5p</b>	<b>GNG13</b> , <i>ALDOA</i> , PLEKHB2, RFXAP, MASP1	<b>Pathways in cancer</b> , <i>HIF-1 signaling pathway</i> , Metabolic pathways, Antigen processing and presentation, Coronavirus disease - COVID-19	Stroke, Hepatitis B Virus Infection, Sepsis
<b>hsa-miR-125a-3p- AL11</b>	BOK, NIT1, MEAF6, OXLD1, TRAF3IP3	Apoptosis	Rheumatoid Arthritis, Heart Failure, Lung Neoplasms
<b>hsa-miR-130a-3p</b>	KDM2A, <i>MDM4</i> , KLF7, ENPP5, MYBL1	MicroRNAs in cancer, <i>p53 signaling pathway</i>	Thyroid Neoplasms, Muscle Atrophy, Epilepsy
<b>hsa-miR-143-3p</b>	C1orf74, ITM2B, SLC25A15, ABHD14A, SLC30A8	Metabolic pathways	Colon Neoplasms, Colorectal Carcinoma, Lymphoma, B-Cell
<b>hsa-miR-148b-3p</b>	C18orf25, S1PR1, DCP2, PNRC2, PTPRA	FoxO signaling pathway, Sphingolipid signaling pathway, RNA degradation	Asthma, Anxiety Disorders, Lung Neoplasms

<b>hsa-miR-150-5p</b>	MYB, MDM4, ENSA, ADIPOR2, HILPDA	MicroRNAs in cancer, <i>p53 signaling pathway</i> , Cellular senescence, Renin secretion	Lupus Vulgaris, Sepsis, Human Immunodeficiency Virus Infection
<b>hsa-miR-17-5p</b>	GPR6, HAUS8, VSX1, PKD2, NKIRAS1	Taste transduction	Leukemia, Melanoma, Endometriosis
<b>hsa-miR-193a-5p</b>	PCDHA7, PCDHA5, CA7, SPRED3, GANAB	Metabolic pathways, ABC transporters	Eosinophilic Esophagitis, Sepsis, Intrahepatic Cholangiocarcinoma
<b>hsa-miR-197-3p</b>	CD53, ZIK1, RNF146, USP41, TMEM30C	Herpes simplex virus 1 infection	Diabetes Mellitus Type 2, Myocardial Infarction, Lung Neoplasms
<b>hsa-miR-199a-3p</b>	KLHL3, SERPINE2, TMSB4X, PAWR, NLK	Regulation of actin cytoskeleton, <i>Adherens junction</i> , <i>MAPK signaling pathway</i>	Parkinson Disease, Graft-Versus-Host Disease, Chronic Hepatitis C
<b>hsa-miR-20a-5p</b>	GPR137C, CYBRD1, VLDLR, CROT, COX8C	Mineral absorption, Lipid and atherosclerosis, Pathways in cancer, <i>mTOR signaling pathway</i>	Leukemia, Carcinoma Hepatocellular
<b>hsa-miR-223-3p</b>	FBXW7, RHOB, LELP1, PTS, TBC1D17	Ubiquitin mediated proteolysis, Salmonella infection, RNA degradation	Leukemia, Lymphoblastic, Sepsis, Diabetes Mellitus, Type 2
<b>hsa-miR-24-3p</b>	SNN, FASLG, REEP2, STRADB, NFASC	<b>Apoptosis, Pathways in cancer</b> , Proteoglycans in cancer, Cell adhesion molecules, <i>mTOR signaling pathway</i>	Lung Neoplasms, Pancreatic Neoplasms, Leukemia
<b>hsa-miR-26a-5p</b>	STRADB, ARPP19, MAB21L1, CREBZF, ZDHHC6	AMPK signaling pathway, <i>mTOR signaling pathway</i>	Alzheimer Disease, Diabetic Nephropathy, Chronic Hepatitis B

<b>hsa-miR-296-5p</b>	HMGA1, EPN1, RNF44, <i>TFRC</i> , TEAD3	Endozytose, <i>HIF-1-signaling pathway</i>	Lupus Vulgaris, Atherosclerosis, Hypertension
<b>hsa-miR-32-5p</b>	ZFYVE21, PCOLCE2, BTLA, ANP32E, G3BP2		Lung Neoplasms, Colorectal Carcinoma, Viral Infectious Disease
<b>hsa-miR-326</b>	KCNIP2, CEP85, CTRC, SYS1, ZNF394		Multiple Sclerosis, Leukemia, Lymphoblastic, Acute; Diabetes Mellitus, Type 1
<b>hsa-miR-342-3p</b>	DTNBP1, BTN2A1, RGS4, UBE2D2, MATN1	Protein processing in endoplasmic reticulum	Glioblastoma, Multiple Myeloma, Sepsis
<b>hsa-miR-410-3p</b>	NPPC, DCTN6, CBFβ, TRAPPC3, ARFIP1	cGMP-PKG signaling pathway, Vascular smooth muscle contraction, Pathways of neurodegeneration	Stroke, Leukemia, Myeloid, Chronic; Colorectal Carcinoma
<b>hsa-miR-484</b>	HSDL2, DBNDD2, TARBP2, CYB561D1, ARSD		Pancreatic Neoplasms, Metabolic Syndrome, Prostate Neoplasms
<b>hsa-miR-486-5p</b>	GPX8, CSPG5, SRSF3, KIAA0226L, BTAF1	Metabolic pathways, Herpes simplex virus 1 infection	Lupus Vulgaris, Sepsis, Diabetes Mellitus, Type 2
<b>hsa-miR-490-3p</b>	VDAC1, TMOD3, COMMD10, PROSC, HNRNPA1	Alzheimer disease, Influenza A, Spliceosome	Colorectal Carcinoma, Chondrosarcoma, Ovarian Neoplasms
<b>hsa-miR-548d-5p</b>	TBCA, CAMLG, <i>GHRL</i> , SRP9, CBWD7	<i>cAMP signaling pathway</i> , Protein export	Chronic Hepatitis B, Glioma; Lymphoma, Non-Hodgkin
<b>hsa-miR-576-3p</b>	NPFFR2, ZNF616, MARCH11, GIMAP7, KRTAP21-2	Neuroactive ligand-receptor interaction, Herpes simplex virus 1 infection	Glioma, Melanoma, Bladder Neoplasms
<b>hsa-miR-885-5p</b>	GALNT3, ZNF812, ZADH2, FAM229B, NUDCD2	Metabolic pathways	Pancreatic Neoplasms, Alzheimer Disease, Myasthenia Gravis

<b>hsa-miR-92b-3p-</b>	OAZ3, CHCHD10, SERTAD3, MARCH4, NKX2-4	Amyotrophic lateral sclerosis	Heart Failure, Bladder Neoplasms, Gastric Neoplasms
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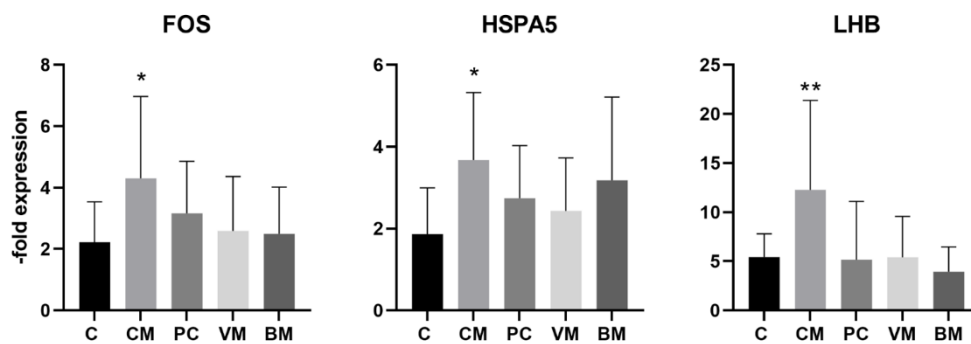
**Table S3** mRNAs used in TaqMan Array Cards. Next to the gene symbol, the TaqMan Assay ID is listed (Thermo Fisher Scientific).

mRNA (gene symbol)	TaqMan assay ID
AARS	Hs00609836_m1
ABCC3	Hs02513562_s1
ANP32C	Hs00606537_s1
APOBEC3H	Hs00419665_m1
ATP2A1	Hs01092284_g1
CD9	Hs01124022_m1
CLEC1B	Hs00212925_m1
CLPS	Hs02558461_s1
CSF3R	Hs01116082_g1
DES	Hs00157258_m1
E2F1	Hs00153451_m1
FOS	Hs05634922_s1
GRK2	Hs00176395_m1
HSPA5	Hs00946087_g1
IFNA5	Hs04186137_sH
ITGA2B	Hs01116228_m1
ITGB3	Hs01001469_m1
ITGB5	Hs00174435_m1
KCNH2	Hs00542479_g1
KIF15	Hs01085295_m1
LHB	Hs00751207_s1
MMP14	Hs01037006_gH
MMP9	Hs00957562_m1
MT1E	Hs01938284_g1
MUC4	Hs00366414_m1
MUC5B	Hs06629268_s1
OR3A2	Hs01635424_s1
PAM16	Hs00211426_m1
PCDHGC3	Hs00159905_m1
PILRA	Hs00603661_g1
RILP	Hs00388296_g1
RIN1	Hs00182870_m1
S100A3	Hs00161483_m1
SLC24A3	Hs00915003_m1
SLC35G3	Hs01586570_sH
SLC39A3	Hs00292942_m1

SLC43A1	Hs00992327_m1
SLC7A5	Hs01001187_m1
SPC24	Hs00699347_m1
TGFB1I1	Hs00901623_g1
THBS1	Hs00962908_m1
TNFAIP3	Hs00234713_m1
TNFRSF10C	Hs00182570_m1
TREM1	Hs00218624_m1
TUBB1	Hs00917771_g1
VCX	Hs03645839_gH
VEGFA	Hs00900055_m1

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Figure S1



Expression levels of exosomal mRNAs.