Supplementary Table 1: Various miRNA and their role in Cancer immunotherapy

miRNA	**Cancer type**	***In vitro/in vivo***	**Model**	**Function**	**References**
miR-424-5p	TNBC	*In vitro*	MDAMB 231, BT474, HCC1500, HCC1806, HCC1954 and MM231	promotes proinflammation and enhances antitumor cytotoxicity ↓PD-L1,↑ proinflammatory cytokines ↓antinflammatory cytokines	**[72]**
		In vivo	Balb/c nude mice	Decreased tumor volume	
MALAT-1,miR-182	Breast cancer	*In vitro*	MDA-MB-231	miR-182/si-MALAT-1 co-transfection lowered MSLN and PIG-C levels	**[73]**
miR-340	Pancreatic Cancer	*in vitro*	293 T ,Panc02 &PANC1	restoration of miR-340 expression downregulatesCD47 and promote phagocytosis of macrophages tumor growth	**[74]**
		in vivo	C57BL/6 mice	↓Tumor growth	
miR-27a-3p	lung adenocarcinoma	*in vitro*	3T3-L1 murine adipocyte,	↓ICOS+ T cell proliferation	**[75]**
		in vivo	mouse lymphocyte	IFN gamma secretion	
miR-5119mimic engineered DC	Breast Cancer	*in vitro*	spleen DCs from mouse breast	downregulated PD-L1 and prevented T cell exhaustion restored function to exhauste CD8+T cells,↑ cytokine production	**[76]**
		in vivo	cancer-bearing mice	↓tumor growth	
miR-200a	Osteosarcoma	*in vitro*	U2OS, 143B, and K7,CD8+ T	MiRNA-200a overexpression induced the down regulation of PD-L1CD8+ T cells co-cultured	**[77]**

				with miRNA 200a-overexpressing cells showed reduced survival,proliferation, and secretion of granzyme B and perforin	
miR-140-3p	ovarian cancer	*in vitro*	NK-92, OVCAR-3, LNK	blocked NK cells cytotoxicity	**[78]**
		in vivo	Athymic BALB/c mice	↓tumor growth	
miR-130a	NSCLC	*in vitro*	NK cell ,A549	miR-130a overexpression potentiatedkilling ability of NK cells	**[79]**
miR-34a	cervical cancer	*in vitro* *in vivo*	U14 cell line xenograft mouse	ultrasound-mediated PTX-miR-34a-MBs synergistically inhibit the growth of cervical cancer via the upregulation of miR-34a and downregulation of Bcl-2 and CDK6	**[80]**
miR-155	mouse melanoma	*in vivo*	mouse model	Phf19 through downregulation of the Akt inhibitor, Ship1. Phf19 orchestrates a transcriptional program extensively shared with miR-155 to restrain T cell senescence and sustain CD8+ T cell antitumor responses	**[81]**
miR-21	bone marrow	*in vivo*	mouse model	miR-21 as a critical component of HSPC viability and essential for bone marrow recovery following irradiation.	**[82]**

miRNA-148a-3p	colorectal cancer	*in vitro*	SW837 and HCT116	miR-148a-3p negatively regulated PD-L1 expression, regulatory mechanism of PD-L1 expression on tumor cells and immune suppression via miR-148a-3p downregulation	**[83]**
miRNA-136-5p	breast cancer	*in vitro*	MCF-10A, MDA-MB-231 MCF-7, T-47D SK-BR-3 ,BT-474 HEK293T cells	knockdown of HERC4 in human breast cancer cells dramatically suppressed their proliferation, survival migration and tumor growth in vivo, whilethe overexpression of HERC4 promoted their aggressive tumorigenic activities	**[84]**
		in vivo	mice model	↓tumor growth	
mir-320a	lung cancer	*in vitro*	HBEC3KT, A549, Calu-1, H1299 and H460 LT73	mir-320a secreted by neutrophils promoted an M2-like protumorigenic phenotype through downregulation of STAT4 when shuttled into macrophages	**[85]**
		in vivo	mice model		
Let-7	HNSCC	*in vitro* *in vivo*	HNSCC tissues tumor-bearing C3H mice	promoted PD-L1 degradation CTLA-4 blockade	**[86]**
miR-192-5p	Lung cancer	*in vitro*	A549 and NCI-H1299 cells	inhibited the proliferation, migration and invasion of lung cancer through targeting TRIM44	**[87]**
miR-149-3p	Breast cancer	*in vitro*	CD8+ T	reduced apoptosis,	**[88]**

				downregulated mRNAs encoding PD-1, TIM-3 BTLA and Foxp1,T cell proliferation ,Cytokine secretion	
miR-186	Neuroblastoma	*in vitro* *in vivo*	CHLA-136 and LAN-5 mice model	miR-186 expression was down-regulated in high versus low-risk, significantly short event-free survival and overall survival probability	**[89]**
miR-181b	lung cancer	*in vitro*	A549 cells	miR-181b expression was downregulate in lung cancer tissues ($P < 0.05$), Overexpression of miR-181b decreased the protein level of Sox6 and suppressed the cell proliferation and metastasis (both $P < 0.05$	**[90]**
miR-20a	Osteosarcoma	*in vitro*	SAOS-2 ,U2OS,293T ,HeLa, LM7	↓Fas expression	**[91]**
		in vivo	Mice	nanoparticle-formulated anti-miR-20a oligonucleotides suppressed osteosarcoma lung metastasis	
miR-142-5p	adenocarcinoma	*in vitro*	Panc02	overexpression of miR-142-5p decreased PD1	**[92]**
		in vivo	C57BL/6 mice	decreased tumor growth enhanced anti-tumor immunity	
miR-424(322)	Ovarian cancer	*in vitro*	OVCAR-3, Skov3 ,Skov3	inhibited PD-L1 and CD80 expression reversed chemoresistence	**[93]**
miR-195, miR-497	breast cancer	*in vitro*	MCF7, MDA-MB-	CD274 is potentially regulated	**[94]**

			231 SK-BR-3	by miR-195and miR-497	
miR-621	hepatocellular carcinoma	*in vitro* *in vivo*	LO2, HepG2, Smmc-7721 and Bel-7404 cell Mice model	overexpression miR-621 can inhibit FBXO11 ultimately enhancing chemo sensitivity	**[95]**
miR-613	colon cancer	*in vitro*	HCT-116 and Lovo cells	miR-613 was upregulated in CC tissue samples and promotes the proliferation, invasion and migration of CC cells by targeting ATOH1 likely via activating JNK1 pathway and upregulating MUC2	**[96]**
miR-203	hepatocellular carcinoma	*in vitro* *in vivo*	tissue samples and Mice model	Bmi-1 mRNA and protein were upregulated, Overexpression of miR-203 in HepG2 and Smmc-7721 cells increases their sensitivity to ionizing radiation in vitro and in vivo	**[97]**
miR-374b	liver cancer	*in vitro* *in vivo*	HepG2, PLC and Huh7 cell lines and Mice model	the targeted killing effect of CIK cells was associated with the down regulation of PD-1 gene expression	**[98]**
miR-122	cervical cancer	*in vitro*	SiHa, CaSki, HeLa and C33A cell lines	miR-122 might induce IFN-I pathway by blocking the negative regulator of it miR-122 inhibited HPV through both binding to E6 mRNA directly	**[99]**

				and promoting type I IFN signaling pathway indirectly in cervical carcinoma cell lines	
miR-34c	Osteosarcoma	*in vitro* *in vivo*	SAOS-2, U2OS, NARF U2OS cell lines Mice model	The p53-dependent miR-34c is the most significantly down-regulated RUNX2 targeting microRNAs in OS., a novel p53-miR-34c-RUNX2 network controls cell growth of osseous cells and is compromised in OS.	[**100]**
miRNA-15b	lung cancer	*in vivo*	mice model	Up-regulation of miRNA-15b in tumor environment might negatively regulate anti-tumor immunity through inhibiting function of CD8+ T cells	[**62]**
miR-146a	hepatocellular carcinoma	*in vitro* *in vivo*	HepG2 , PLC/PRF/5 NK-92, NKL, Hepa 1–6 mice model	miR-146a was downregulated by blocking activated and exerted negative effects on anti-tumor immune response which resulted in the upregulation of cytokines such as TGF-β, IL-17, VEGF and downregulation of type I IFN to create an immunosuppressive microenvironment.	**[101]**
miR-155	skin cancer	*in vitro*	LB2201-MEL LB2259-MEL	MITF-M is downregulated by inflammatory stimuli due to	**[102]**

		in vivo	SK-MEL-23 mice model	miR-155 upregulation	
MiR-125a-5p+ trastuzumab	gastric cancer	*in vitro*	AZ521, KATO, MKN1 MKN45, MKN74, NUGC3,NUGC4	↓proliferation of gastric cancer cells	**[103]**