Supplementary Materials

Table S1. miRNAs expression in HCC development

Sr. No	miRNAs	Expression	P-value	Reported region	References
1	miR-10b	High	< 0.01	China	(Dongliang Li et al., 2018)
2	miR-17-5p	Low	< 0.05	Turkey	(Oksuz et al., 2015)
3	miR-18a	High	< 0.01	China	(L. Li et al., 2012)
4	miR-19a	High	< 0.01	China	(G. Yu et al., 2016)
5	miR-21	Low	0.0487	India	(Bandopadhyay et al., 2014)
6	miR-22	High	0.027	China	(Jiang et al., 2011)
7	miR-22-3p	High	< 0.01	China	(D. Chen et al., 2021)
8	miR-23b	High	< 0.01	China	(J. Zhou et al., 2011)
9	miR-23b-3p	High	< 0.01	China	(J. Li et al., 2019)
10	miR-24-3p	Low	< 0.05	Turkey	(Oksuz et al., 2015)
	miR-24-3p	High	< 0.05	China	(Meng, Wang, & Jia, 2014)
11	miR-27a	High	0.03	Egypt	(Rashad, El-Shal, Shalaby, & Mohamed, 2018)
12	miR-28-5p	Low	< 0.05	China	(Shi, Teng, & Biochemistry, 2015)
13	miR-29a-3p	Low	< 0.05	China	(Z. Xiao, Wang, Ding, & bioscience, 2019)
14	miR-30a-5p	Low	< 0.05	China	(LiWF, 2016)
15	miR-32-5p	High	< 0.01	China	(Fu et al., 2018)
16	miR-34a	High	< 0.01	USA	(N. Li et al., 2009)
17	miR-34c	Low	< 0.01	China	(Y. Wang et al., 2015)
18	miR-93	High	0.022	USA	(Ohta et al., 2015)
19	miR-95-3p	High	< 0.01	China	(Ye et al., 2016)
20	miR-96	High	< 0.01	China	(Y. Chen, Dong, Yu, & Wang, 2015)

21	miR-99a	Low	< 0.01	China	(Dong Li et al., 2011)
22	miR-122	High	< 0.05	USA	(Ambade, Satishchandran, & Szabo, 2016)
23	miR-122-5p	High	0.011	China	(J. Li et al., 2019)
24	miR-125a	Low	< 0.01	Egypt	(El-Ahwany et al., 2019)
25	miR-125b-5p	Low	0.019	Germany	(Felgendreff et al., 2020a)
26	miR-129-2	Low	< 0.01	China	(Liu et al., 2016)
27	miR-132	Low	0.021	China	(Morishita et al., 2020)
28	miR-133b	Low	< 0.01	China	(Hui Li, Xiang, Liu, Xu, & Tang, 2017)
29	miR-137	Low	< 0.05	China	(J. Wang et al., 2021)
30	miR-139	Low	< 0.01	Egypt	(El-Ahwany et al., 2019)
31	miR-145	Low	0.0486	India	(Bandopadhyay et al., 2014)
32	miR-149	Low	0.023	China	(Luo et al., 2015)
33	miR-150-5p	Low	0.015	China	(T. Li et al., 2014)
34	miR-152	Low	< 0.01	France	(Miquelestorena - Standley et al., 2018)
35	miR-155	High	< 0.05	China	(Y. Zhang et al., 2012)
36	miR-182	Low	0.015	Egypt	(Shaheen et al., 2018)
37	miR-187-3p	Low	< 0.01	China	(Dou et al., 2016)
38	miR-192	High	< 0.01	China	(J. Zhou et al., 2011)
39	miR-193-5p	Low	< 0.03	India	(Ghosh et al., 2016)
40	miR-194	High	< 0.01	China	(J. Zhou et al., 2011)
41	miR-195	Low	0.04	Egypt	(Motawi, Shaker, El-Maraghy, & Senousy, 2015)
42	miR-199a-5p	Low	0.04	Germany	(Felgendreff et al., 2020b)
43	miR-205	Low	< 0.01	China	(T. Zhang et al., 2013)

44	miR-210-3p	High	< 0.0308	Japan	(Morishita et al., 2020)
45	miR-211	Low	< 0.01	China	(Deng et al., 2016)
46	miR-222	High	0.046	China	(Qi et al., 2011)
47	miR-223	High	0.037	USA	(Zheng et al., 2017)
	miR-223	Low	< 0.01	China	(J. Zhou et al., 2011)
	miR-223	Low	< 0.05	China	(G. Yu et al., 2016)
48	miR-224	High	< 0.05	China	(H. Zhang, Chen, Yang, Zhang, & Wang, 2014)
49	miR-224-5p	High	0.018	China	(J. Li et al., 2019)
50	miR-300	Low	0.02	China	(R. Wang et al., 2018)
51	miR-320a	Low	< 0.05	China	(Lv et al., 2017)
52	miR-325	Low	< 0.05	China	(Huifen Li, Huang, & Luo, 2015)
53	miR-326	Low	< 0.05	China	(S. Hu, Ran, Chen, Zhang, & Xu, 2017)
54	miR-330-3p	High	< 0.01	China	(J. Li et al., 2019)
55	miR-331-3p	High	0.02	China	(X Zhao et al., 2019)
56	mi-345	Low	< 0.05	China	(M. Yu et al., 2017)
57	miR-361-5p	Low	< 0.01	China	(Cheng et al., 2019)
58	miR-362-5p	High	< 0.01	China	(Ni et al., 2015)
59	miR-370	Low	< 0.01	China	(He & He, 2019)
60	miR-371a-5p	Low	< 0.05	China	(P.-s. Bai, Hou, & Kong, 2018)
61	miR-373-3p	High	< 0.05	China	(Hongbin Li et al., 2022)
62	miR-375	Low	< 0.05	China	(W. Zhang et al., 2020)
63	miR-384	Low	< 0.05	China	(P. s. Bai, Xia, Sun, Kong, & Medicine, 2017)
64	miR-424-5p	Low	< 0.05	China	(Du et al., 2019)
65	miR-431	Low	< 0.05	China	(Sun et al., 2015)

66	miR-452-3p	High	< 0.01	China	(Tang et al., 2017)
67	miR-486-5p	Low	< 0.05	China	(X. P. Huang et al., 2015)
68	miR-490-5p	Low	< 0.01	China	(B. Xu et al., 2017)
69	miR-491	High	< 0.01	China	(Y. Zhou et al., 2013)
70	miR-493	Low	< 0.05	China	(W. Ding et al., 2018)
71	miR-494-3p	High	0.025	China	(J. Li et al., 2019)
72	miR-503	Low	< 0.01	China	(Y. Xiao et al., 2016)
73	miR-548p	Low	< 0.01	China	(X. M. Hu et al., 2016)
74	miR-603	High	< 0.01	China	(Lin et al., 2021)
75	miR-622	Low	< 0.01	China	(Song et al., 2015)
76	miR-744-5p	Low	< 0.01	China	(W. Huang et al., 2021)
77	miR-801	High	< 0.01	China	(J. Zhou et al., 2011)
78	miR-877-5p	Low	< 0.01	China	(Yan, Qiu, Sun, & Li, 2018)
79	miR-922	High	< 0.05	China	(Liu et al., 2018)
80	miR-940	Low	< 0.05	China	(D. Ding et al., 2016)
81	miR-944	High	0.019	USA	(Zheng et al., 2017)
82	miR-1236	Low	< 0.05	China	(C. Zhang, Liu, & Zhang, 2020)
83	miR-1296	Low	< 0.05	China	(Q. Xu et al., 2017)
84	miR-1468	High	< 0.05	China	(Liu et al., 2018)
85	miR-3194-3p	Low	< 0.05	China	(Yao et al., 2019)
86	miR-3651	High	< 0.01	China	(Xinyang Zhao, Song, Miao, Zhu, & therapy, 2019)
87	miR-4319	Low	< 0.01	China	(Han et al., 2019)
88	miR-6875-3p	High	< 0.05	China	(Xie et al., 2019)

Table S2. miRNAs related with HBV, HCV and alcohol induced HCC.

Sr. No	miRNAs	Expression in serum of HCC	Region	References
1	Exosomal miR-10b	Upregulated	China	Liu, W.H., Ren, L.N., et al 2015
2	Exosomal miR-18a	Upregulated	Korea	Sohn, W., et al 2015.
3	Exosomal miR-21	Upregulated	China	Liu, W., Chen, S. and Liu, B., 2016
4	Exosomal miR-34a	Downregulated	China	Jiao, C., Jiao, X., et al 2017
5	Exosomal miR-34c	Downregulated	China	Jiao, C., Jiao, X., et al 2017
6	Exosomal miR-93	Upregulated	China	Xue, X., et al., 2018.
7	Exosomal miR-122	Downregulated	USA	Fan, B., et al 2015.
8	Exosomal miR-195	Downregulated	Korea	Sohn, W., et al 2015.
9	Exosomal miR-222	Upregulated	Korea	Sohn, W., et al 2015.
10	Exosomal miR-223	Upregulated	UK	Aucher, A., et al 2013.
11 12	Exosomal miR-224	Upregulated	Korea	Sohn, W., et al 2015.

Table S3. CircRNAs-miRNAs interactions in HCC.

circRNAs	miRNA	Pathology	Target gene, protein	Sample	Methodology	References
hsa_circ_0000517	competed miR-326	HCC	SMAD6, IGF1R	tissue and cell line	cell culture, RT-PCR, flow cytometry, RIP, westren blot, different assays	Shuwei He, et al 2020 DOI: 10.1186/s12935-020-01447-w
hsa_circ_0005075	target and inhibit miR-431	HCC	Bcl-D	tissue	cell culture, western blot, RNA extraction, RT-PCR, different assays	Ming-Fang L., et al 2018 DOI: 10.1016/j.biopha.2018.01.150
hsa_circ_0005397	regulating the miR-326	HCC	PDK2	tissue	cell culture, RNA extration, RT-PCR, Caspase-3 activity assay,	Jianzhuang Gong, et al 2021 doi.org/10.1002/jgm.3332
circ_0008450	sponge miR-548p	HBV induced HCC	HKa	tissue and cell line	RNA extraction, RT-PCR, different assay	Juan Zhang, et al 2018 doi.org/10.1002/jcb.28224
	sponging miR-431	HCC	AKAP1 via	cell and tissue	RT-PCR, Cell Counting Kit-8, flow cytometry and glycolysis assays, westren blot	Du Q, Han et al 2020. doi: 10.3892/ol.2020.12251.
Circ-0051443	competitive bound to miR-331-3p	HCV induced HCC	BAK1	tissue and cell line	cell culture, exsome isolation, westren blot, RT-PCR, IHC, RIP, different assays	WeiChena, et al 2020 doi.org/10.1016/j.canlet.2020.01.022
circ_0061395	negitively regulating the miR-877-5p	HCC	PIK3R3	tissue, cell line, serum	cell culture, TEM, westren blot, different assyas, RT-PCR, flow cytometry, RIP, IHC	Yanhui Yu, et al 2021 DOI: 10.1186/s12935-020-01695-w
hsa_circ_0070269	sponging miR-182	HCV induced HCC	NPTX1	tissue and cell line	ell culture, RT-PCR, different assay, westren blot	Xiaotong Su, et al 2019 DOI: 10.1016/j.biopha.2019.109497
circ_0072088	sponge of miR-375	HBV induced HCC	JAK2 and p-STAT3	tissuee and cell line	cell culture, RT-PCR, different assay, flow cytometry, westren blot,	Li et al., 2021DOI:10.1002/iub.2520
hsa_circ_0085616	miR-326	HCC	MAPK1/CSF-1	Tissue and cell line	CircRNA pull down assay, RNA extreaction, RNA immunoprecipetation (RIP), qRT-PCR, westren blot, ELISA	Zhi-Qiang Hu, et al 2020 DOI: 10.1002/hep.31068

circ_0091579	interact miR-490-5p	HCC	CASC3	tissue and cell line	cell culture, RNA extraction, RT-PCR, westren blot, different assays	Wei Liu, et al 2021 DOI: 10.1089/cbr.2019.3472
hsa_circ_0101432	absorbing miR-622	HCC	MAPK1	tissue	RNA extartion, microaaray, cell culture, RT-PCR	Haibo Zou, et al 2019 doi.org/10.1080/15384101.2019.1618120
hsa_circ_0103809	suppressed miR-490-5p	HCC	SOX2	cell lines and tissue	cell culture, RT-PCR, Westren blot, IHC, flow cytometry, different assays	Huajie Cai, et al 2018 PMCID: PMC6038084
hsa_circ_101280	sponging miR-375	HBV induced HCC	JAK2	tissue	cell culture, RT-PCR, different assay, flow cytometry	Shuang Cao, et al 2018 doi.org/10.1111/imcb.12213
circ-102,166	sponge miR-182	HCV induced HCC	FOXO3a, MTSS1, SOX7, p-RB and c-MYC	Tissue, cell line	RNA extraction, RT-PCR,	Rong Li, et al 2021 doi.org/10.1007/s13402-020-00564-y
circRNA_104348	target miR-187–3p	HCC	RTKN2, Wnt/β-catenin signaling pathway	tissue	RNA extraction, RT-PCR, cell culture, different assay	Guanqun Huang, et al 2019 .doi.org/10.1038%2Fs41419-020-03276-1
circ-BIRC6	sponge of miR-877-5p	HCC	YWHAZ	cell and tissue	RT-PCR,flow cytometry, different assays	Liu Y, et al. 2020 doi: 10.2147/OTT.S261700.
circFAT1	sponges miR-30a-5p	HCC	REEP3	tissue and cell line	cell culture, RT-PCR, FISH, RIP, different assays, westren blot	Hailiang Wei, et al 2020 https://doi.org/10.1111/jcmm.16085
circ-ITCH	sponge miR-224-5p	HCV induced HCC	MafF	tissue and cell line	cell culture, IHC, RNA extraction, RT-PCR, , different assay, westren blot	Minhua Wu, et al 2020 doi: 10.3727/096504020X15796890809840
circPTN	sponging miR-326	HCC	ErbB/PI3K	tissua and cell line	cell culture, RT-PCR, different assays, FISH	Benli Jia, et al 2020 doi: 10.2147/OTT.S251300
circSLC7A11	sponge miR-330-3p	HCC	CDK1	tissue and cell line	cell culture, different assya, RT-PCR, IHC,RIP,Westrn blot	Yu Huang, et al 2021 https://doi.org/10.1186/s12935-021-02351-7
circ-RNF13;	miR-424-5p spong	HBV induced HCC	TGIF2	tissue and cell	cell culture, RT-PCR, different assays	Chen Y, et al 2020. doi: 10.17305/bjbms.2020.5266. .
circ-TCF4.85	miR-486-5p knodown the cicRNA	HCC	ABCF2	tissue and cell line	cell culture, RT-PCR, Microarray-based circRNA expression profiling, westren blot, flow cytometry, FISH, IHC, different assays	Jun Gao, et al 2019 https://doi.org/10.1002/1878-0261.12603
Circ-ZNF652	target miR-29a-3p	HCC	GUCD1	serum and tissue	RT-PCR, westren blot,RNase R digestion assay, MTT, RIP, different assays,	Li Y, et al. 2020 doi: 10.2147/CMAR.S259424.
ciRS-7	miR-944	alcohol induced HCC	NOX4 Pathway	tissue and cell line	qRT-PCR), Western blot, RNA pull-down, and luciferase reporter assay	Chuangjie Mao, et al 2022 DOI: 10.1615/CritRevEuk

						aryotGeneExpr.2022039225
circFoxo3	miR-199a-5p	alcohol induced HCC	ABCC1	tissue and cell line	cell culture, RT-PCR, Westren blot, IHC, flow cytometry, different assays	Wei Huang et al 2020 DOI: 10.2147/OTT.S243571

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