

Table SI. Specific forward and reverse oligonucleotide primers used for quantitative PCR.

Gene	Primer sequence (5'-3')
CCNB2	F: CAACCCACCAAAACAACA R: AGAGCAAGGCATCAGAAA
CCNE2	F: TCAAGACGAAGTAGCCGTTTAC R: TGACATCCTGGGTAGTTTTCTC
CDK4	F: AGTTCGTGAGGTGGCTTTA R: GGGTGCCTTGTCCAGATA
CSNK1E	F: GAATTCCCGTTCTCCTGTGTCTA R: AAAACCAGGAATGGAAGATGGAG
HOMER1	F: GATCCTGCCTAGCCTTCT R: GGAGCGAGCAACCAAACG
HSP90AA1	F: CCAGAGTGCTGAATACCCGC R: TTAACAGGTGCCCTGCTTCTC
NRAS	F: TCCAGCTAATCCAGAACCACT R: TGGTCTCTCATGGCACTGTA
PPP2CA	F: GATCTTCTGTCTACATGGTGGTCTC R: ACACATTGGACCCTCATGGGGAA
PRKAA2	F: GTGAAGATCGGACACTACGTG R: CTGCCACTTTATGGCCTGTTA
RAC1	F: CGATCCGAGCAGTCCTCT R: GGGGCTGAGACATTTACAACA
ACTB	F: CTCTTCCAGCCTTCCTTCCT R: AGCACTGTGTTGGCGTACAG
F, forward; R, reverse.	

Table SII. Significant changes of let-7c-5p target genes between different types of liver hepatocellular carcinoma tissues and normal liver tissues obtained from Oncomine.

Gene	Datasets name	Overexpression gene rank	P-value	t-test	Fold change
ATF2	Roessler Liver	687 (in top 6%)	1.61×10^{-6}	5.74	1.51
	Roessler Liver 2	364 (in top 3%)	2.38×10^{-54}	18.29	1.72
BCL2	Mas Liver	531 (in top 5%)	5.03×10^{-8}	6.24	1.64
	Wurmbach Liver	2782 (in top 15%)	2.00×10^{-3}	3.13	1.51
CCNB2	Roessler Liver	137 (in top 2%)	1.22×10^{-9}	9.06	3.67
	Roessler Liver 2	240 (in top 2%)	4.51×10^{-61}	21.27	2.67
	Wurmbach Liver	98 (in top 1%)	1.29×10^{-9}	7.85	4.74
CCND2	Mas Liver	418 (in top 4%)	7.03×10^{-9}	6.65	1.76
	Wurmbach Liver	1941 (in top 10%)	3.56×10^{-4}	3.66	1.74
CCNE2	Wurmbach Liver	3371 (in top 18%)	4.00×10^{-3}	2.91	1.86
CDK2	Roessler Liver 2	1455 (in top 12%)	6.25×10^{-30}	12.35	1.57
CDK4	Chen Liver	339 (in top 4%)	9.85×10^{-13}	7.62	1.64
	Roessler Liver	646 (in top 6%)	1.20×10^{-6}	5.72	2.24
	Roessler Liver 2	175 (in top 2%)	3.97×10^{-65}	20.82	2.44
CDK6	Wurmbach Liver	2107 (in top 11%)	5.04×10^{-4}	3.80	2.68
CHUK	Roessler Liver 2	1660 (in top 14%)	6.45×10^{-27}	11.50	1.58
COL1A1	Mas Liver	83 (in top 1%)	4.54×10^{-13}	9.86	6.08
	Roessler Liver	1931 (in top 16%)	4.26×10^{-4}	3.67	3.22
	Wurmbach Liver	521 (in top 3%)	1.68×10^{-6}	5.38	3.49
COL1A2	Chen Liver	1226 (in top 12%)	8.96×10^{-7}	4.95	1.81
	Mas Liver	19 (in top 1%)	5.08×10^{-17}	12.06	4.93
	Roessler Liver	1806 (in top 15%)	2.77×10^{-4}	3.79	4.20
	Roessler Liver 2	1757 (in top 14%)	1.21×10^{-25}	11.08	3.23
	Wurmbach Liver	410 (in top 3%)	7.10×10^{-7}	5.92	5.23
COL4A1	Chen Liver	723 (in top 7%)	5.51×10^{-9}	6.00	1.58
	Mas Liver	110 (in top 1%)	1.40×10^{-12}	9.86	3.76
	Roessler Liver	212 (in top 2%)	7.40×10^{-9}	7.12	4.60
	Roessler Liver 2	284 (in top 3%)	3.82×10^{-58}	19.19	4.08
	Wurmbach Liver	61 (in top 1%)	1.16×10^{-10}	9.74	3.71
COL4A2	Chen Liver	459 (in top 5%)	4.56×10^{-11}	6.90	1.79
	Mas Liver	222 (in top 2%)	1.01×10^{-10}	9.45	3.49
	Roessler Liver	882 (in top 7%)	5.66×10^{-6}	5.14	3.08
	Roessler Liver 2	1654 (in top 14%)	5.66×10^{-27}	11.46	2.23
	Wurmbach Liver	409 (in top 3%)	7.07×10^{-7}	6.15	3.15
CSNK1E	Roessler Liver	411 (in top 4%)	1.45×10^{-7}	6.84	2.07
	Roessler Liver 2	1017 (in top 9%)	2.99×10^{-37}	14.23	1.63
CREB3L2	Chen Liver	254 (in top 3%)	3.33×10^{-14}	8.14	1.62
FN1	Mas Liver	886 (in top 8%)	1.53×10^{-6}	5.34	2.23
FBXO32	Chen Liver	834 (in top 8%)	1.91×10^{-8}	5.84	1.87
	Wurmbach Liver	770 (in top 4%)	8.16×10^{-6}	4.89	2.24
GNB1	Roessler Liver	1753 (in top 14%)	2.31×10^{-4}	3.99	2.05
	Roessler Liver 2	1069 (in top 9%)	2.58×10^{-36}	13.81	1.90
HOMER1	Roessler Liver	1202 (in top 10%)	2.96×10^{-5}	4.77	2.79
	Roessler Liver 2	1509 (in top 12%)	3.29×10^{-29}	12.55	2.09
	Wurmbach Liver	457 (in top 3%)	1.06×10^{-6}	5.52	4.04
HSP90AA1	Roessler Liver 2	1012 (in top 9%)	2.06×10^{-37}	14.08	1.73
	Wurmbach Liver	1784 (in top 10%)	2.61×10^{-4}	4.73	1.84
IL6R	Chen Liver	1875 (in top 18%)	5.98×10^{-5}	3.94	1.63
ITGAV	Mas Liver	899 (in top 8%)	1.67×10^{-6}	5.26	1.70
	Roessler Liver	2298 (in top 19%)	1.00×10^{-3}	3.35	1.93
	Roessler Liver 2	2000 (in top 16%)	6.97×10^{-23}	10.36	1.84
	Wurmbach Liver	2408 (in top 13%)	9.14×10^{-4}	3.60	1.77
LAMC1	Mas Liver	314 (in top 3%)	1.03×10^{-9}	7.18	1.89
	Roessler Liver	207 (in top 2%)	6.63×10^{-9}	8.21	3.22

Table SII. Continued.

Gene	Datasets name	Overexpression gene rank	P-value	t-test	Fold change
MAPK1	Roessler Liver 2	184 (in top 2%)	1.82×10^{-64}	20.36	3.23
	Wurmbach Liver	47 (in top 1%)	3.23×10^{-11}	8.79	3.66
	Roessler Liver	298 (in top 3%)	3.56×10^{-8}	6.88	1.85
	Roessler Liver 2	132 (in top 2%)	1.63×10^{-68}	21.47	2.17
MDM2	Wurmbach Liver	1420 (in top 8%)	9.32×10^{-5}	4.61	1.85
NRAS	Roessler Liver	758 (in top 7%)	2.53×10^{-6}	5.88	2.16
	Roessler Liver 2	317 (in top 3%)	9.59×10^{-57}	19.44	2.61
PPP2CA	Roessler Liver 2	1262 (in top 10%)	6.56×10^{-33}	12.97	1.63
	Wurmbach Liver	1660 (in top 9%)	1.96×10^{-4}	4.61	1.51
PPP2R5A	Chen Liver	168 (in top 2%)	3.32×10^{-16}	8.91	1.69
	Roessler Liver	659 (in top 6%)	1.37×10^{-6}	5.61	1.65
	Roessler Liver 2	808 (in top 7%)	8.69×10^{-42}	15.39	1.91
	Wurmbach Liver	470 (in top 3%)	1.16×10^{-6}	5.85	1.82
PRKAA2	Chen Liver	894 (in top 9%)	4.27×10^{-8}	5.61	1.89
	Wurmbach Liver	171 (in top 1%)	1.67×10^{-8}	7.20	7.33
PRKAB2	Chen Liver	115 (in top 2%)	4.56×10^{-18}	9.66	2.31
	Roessler Liver	2425 (in top 20%)	2.00×10^{-3}	3.17	1.67
PRLR	Chen Liver	1581 (in top 15%)	1.15×10^{-5}	4.36	1.60
	Wurmbach Liver	3838 (in top 20%)	7.00×10^{-3}	2.66	1.56
RAC1	Roessler Liver	122 (in top 1%)	7.03×10^{-10}	7.79	1.61
SKP2	Chen Liver	1176 (in top 11%)	6.05×10^{-7}	5.03	1.57
	Roessler Liver	1621 (in top 13%)	1.56×10^{-4}	4.00	1.79
	Wurmbach Liver	3117 (in top 25%)	2.67×10^{-13}	7.51	1.54
TGFBR1	Wurmbach Liver	1708 (in top 9%)	2.23×10^{-4}	4.41	2.58
THBS1	Mas Liver	1383 (in top 11%)	2.57×10^{-5}	4.40	2.48
TNFSF10	Mas Liver	678 (in top 6%)	2.60×10^{-7}	5.69	2.48
YWHAG	Wurmbach Liver	811 (in top 5%)	9.61×10^{-6}	5.81	1.65

Table SIII. Detailed alteration frequencies of CCNB2, CCNE2, CDK4, CSNK1E, HOMER1, HSP90AA1, NRAS, PPP2CA, PRKAA2 and RAC1.

Gene	Mutation, % (n)	Amplification, % (n)	Deep deletion, % (n)	mRNA high, % (n)	mRNA low, % (n)	Multiple alteration, % (n)
CCNB2	0.28 (1)	0.83 (3)		8.06 (29)		
CCNE2	0.28 (1)	14.17 (51)	0.28 (1)	6.67 (24)		1.11 (4)
CDK4		0.83 (3)		8.33 (30)		0.83 (3)
CSNK1E	0.83 (3)	0.28 (1)		8.06 (29)		1.11 (4)
HOMER1	0.56 (2)	0.56 (2)		3.06 (11)		
HSP90AA1	1.94 (7)	0.28 (1)		3.06 (11)		
NRAS	0.83 (3)			6.94 (25)		
PPP2CA	0.56 (2)			13.33 (28)	3.06 (11)	0.56 (2)
PRKAA2		0.83 (3)		5.00 (18)		0.28 (1)
RAC1		0.56 (2)		10.83 (39)		0.28 (1)