

Supplementary table 1. Primer sequences for qRT-PCR.

Gene	Forward primer (5'--3')	Reverse primer (5'--3')
<i>MCM10</i>	CCCCTACAGACGATTTCTCGG	CAGATGGGTTGAGTCGTTTCC
<i>CCND1</i>	GCTGCGAAGTGGAACCATC	CCTCCTTCTGCACACATTTGAA
G1/S-regulatory genes		
<i>ABL1</i>	CATCACGCCAGTCAACAGTCT	GTACACCCTCCCTTCGTATCT
<i>CCNA2</i>	GGATGGTAGTTTTGAGTCACCAC	CACGAGGATAGCTCTCATACTGT
<i>CCNE1</i>	AAGGAGCGGGACACCATGA	ACGGTCACGTTTGCCCTTCC
<i>CDC6</i>	ACCTATGCAAACTCCCCATT	TGGCTAGTTCTCTTTTGCTAGGA
<i>CDC34</i>	CATCGACTACCCATACTCTCCA	GAGAATGGTCCTGACGTTCTG
<i>CDK1</i>	GGATGTGCTTATGCAGGATTCC	CATGTACTGACCAGGAGGGATAG
<i>CDK4</i>	ATGGCTACCTCTCGATATGAGC	CATTGGGACTCTCACACTCT
<i>CDK6</i>	TCTTCATTACACCGAGTAGTGC	TGAGGTTAGAGCCATCTGGAAA
<i>CDKN3</i>	TCCGGGGCAATACAGACCAT	GCAGCTAATTTGTCCCGAACTC
<i>CUL1</i>	AGCCATTGAAAAGTGTGGAGAA	GCGTCATTGTTGAATGCAGACA
<i>E2F1</i>	CATCCCAGGAGGTCACTTCTG	GACAACAGCGGTTCTTGCTC
<i>P19</i>	GGGTTTTCGTGGTTCACATCC	CTAGACGCTGGCTCCTCAGTA
<i>P21</i>	TGTCCGTCAGAACCCATGC	AAAGTCGAAGTTCCATCGCTC
<i>P27</i>	TAATTGGGGCTCCGGCTAACT	TGCAGGTCGCTTCCTTATTCC
<i>18S</i>	AAACGGTACCACATCCAAG	CCTCCAATGGATCCTCGTTA

Supplementary table 2. Primary antibodies for WB and IHC.

Antibody	Cat. No	Concentration for WB	Concentration for IHC	Specificity	Company
MCM10	Ab3733	1:1000	1:100	Rabbit	Abcam
Cyclin D1	Ab16663	1:1000	1:200	Rabbit	Abcam
CDK4	12790T	1:1000	/	Rabbit	Cell Signaling
CDK6	13331T	1:1000	/	Rabbit	Cell Signaling
p21	10355	1:1000	/	Rabbit	Proteintech
p27	3686T	1:1000	/	Rabbit	Cell Signaling
RB	Ab181616	1:1000	/	Rabbit	Abcam
pRB	8516T	1:1000	/	Rabbit	Cell Signaling
GAPDH	2118S	1:1000	/	Rabbit	Cell Signaling

Supplementary table 3. Univariate and multivariate analysis of factors associated with OS of HCC patients.

Variables	Case number	MST (months, IQR)	Vital status, n (%)		Univariate analysis		Multivariate analysis	
			Dead	Alive	HR (95% CI)	P	HR (95% CI)	P
Cases	147	73.0 (23.0-109.0)	60 (40.8)	87 (59.2)				
Age (years)								
≤50	76	72.5 (24.5-109.5)	29 (38.2)	47 (61.8)	1 (reference)			
>50	71	74.0 (22.0-109.0)	31 (43.7)	40 (56.3)	1.150 (0.693-1.908)	0.588		
Gender								
Male	129	76.0 (23.5-109.0)	49 (38.0)	80 (62.0)	1 (reference)		1 (reference)	
Female	18	40.0 (17.3-89.0)	11 (61.1)	7 (38.9)	1.950 (1.012-3.757)	0.046	1.830 (0.858-3.942)	0.117
HBsAg								
Negative	30	76.0 (26.5-110.0)	17 (56.7)	13 (43.3)	1 (reference)		1 (reference)	
Positive	117	42.0 (13.5-91.5)	43 (36.8)	74 (63.2)	1.910 (1.087-3.353)	0.024	1.828 (0.990-3.376)	0.054
ALT (U/L)								
≤40	81	73.0 (21.0-109.0)	39 (48.1)	42 (51.9)	1 (reference)			
>40	66	72.5 (25.5-108.5)	21 (31.8)	45 (68.2)	1.599 (0.941-2.719)	0.083		
TBIL (μmol/L)								
≤17.1	110	66.5 (21.8-109.0)	47 (42.7)	63 (57.3)	1 (reference)			
>17.1	37	78.0 (36.0-108.5)	13 (35.1)	24 (64.9)	1.344 (0.727-2.484)	0.346		
PT (s)								
≤13.5	131	74.0 (24.0-110.0)	52 (39.7)	79 (60.3)	1 (reference)			
>13.5	16	40.0 (15.0-95.0)	8 (50.0)	8 (50.0)	1.475 (0.700-3.108)	0.307		
ALB (g/L)								
≥35	137	74.0 (25.0-109.0)	54 (39.4)	83 (60.6)	1 (reference)		1 (reference)	
<35	10	13.5 (4.8-109.0)	6 (60.0)	4 (40.0)	2.452 (1.052-5.714)	0.038	3.771 (1.442-9.861)	0.007
AFP (ng/mL)								
≤200	93	80.0 (27.0-110.0)	33 (35.5)	60 (64.5)	1 (reference)		1 (reference)	
>200	54	52.0 (13.8-100.0)	27 (50.0)	27 (50.0)	1.714 (1.029-2.853)	0.038	1.422 (0.820-2.464)	0.210
Capsule integrity								
Complete	66	96.0 (50.8-111.3)	18 (27.3)	48 (72.7)	1 (reference)		1 (reference)	
No/incomplete	81	45.0 (13.0-83.5)	42 (51.9)	39 (48.1)	2.690 (1.543-4.688)	<0.001	2.388 (1.302-4.379)	0.005
Tumor number								
Single	105	79.0 (27.0-110.0)	33 (31.4)	72 (68.6)	1 (reference)		1 (reference)	
Multiple (≥2)	42	44.5 (9.8-82.8)	27 (64.3)	15 (35.7)	2.626 (1.575-4.377)	<0.001	1.595 (0.897-2.834)	0.112
Tumor differentiation								
I-II	82	76.0 (30.0-110.0)	27 (32.9)	55 (67.1)	1 (reference)		1 (reference)	
III-IV	65	51.0 (12.0-101.5)	33 (50.8)	32 (49.2)	1.829 (1.099-3.043)	0.020	1.849 (1.035-3.305)	0.038
Tumor size								
≤5cm	57	82.0 (49.0-108.5)	17 (29.8)	40 (70.2)	1 (reference)		1 (reference)	

>5cm	90	52.0 (15.0-109.3)	43 (47.8)	47 (52.2)	1.997 (1.138-3.503)	0.016	1.264 (0.642-2.487)	0.498
T stage								
T1-T2	106	76.0 (30.3-109.0)	38 (35.8)	68 (64.2)	1 (reference)		1 (reference)	
T3-T4	41	45.0 (8.0-110.0)	22 (53.7)	19 (46.3)	1.966 (1.162-3.326)	0.012	1.452 (0.784-2.690)	0.236
Vascular invasion								
No	106	77.0 (30.0-109.3)	38 (35.8)	68 (64.2)	1 (reference)		1 (reference)	
Yes	41	45.0 (12.5-103.5)	22 (53.7)	19 (46.3)	1.861 (1.099-3.150)	0.021	0.941 (0.433-2.046)	0.878
BCLC stage								
A-B	102	75.5 (27.0-110.0)	36 (35.3)	66 (64.7)	1 (reference)		1 (reference)	
C	45	57.0 (15.0-98.0)	24 (53.3)	21 (46.7)	1.686 (1.005-2.828)	0.048	1.893 (0.849-4.222)	0.119
MCM10 expression								
Low	85	87.0 (36.0-110.0)	32 (37.6)	53 (62.5)	1 (reference)		1 (reference)	
High	62	46.5 (10.0-81.3)	28 (45.2)	34 (54.8)	1.692 (1.015-2.819)	0.044	1.821 (1.018-3.258)	0.043

The HRs with significant P values (< 0.05) were in bold.

Abbreviations: MCM10, minichromosome maintenance protein 10; MST, median survival time; IQR, interquartile range; HR, hazard ratio; CI, confidence interval; ALT, alanine aminotransferase; TBil, total bilirubin; PT, prothrombin time; ALB, albumin; AFP, alpha-fetoprotein.

Supplementary table 4. Stratified analysis on the association between (MCM10 + Cyclin D1) expression and OS of HCC patients.

[illegible]

≤200	93	35	100.0	69.3-94.3	25	84.0	58.7-88.1	16	51.5	30.3-73.9	17	53.0	37.8-72.6
>200	54	13	110.0	66.6-103.8	12	39.5	24.8-73.4	7	8.0	NA	22	48.0	32.0-62.2
Capsule integrity													
Complete	66	24	100.0	68.6-98.4	20	101.0	65.3-98.7	10	81.5	44.4-101.2	12	85.5	58.1-97.7
No/incomplete	81	24	97.0	67.1-96.9	17	45.0	29.4-62.8	13	12.0	8.0-48.4	27	41.0	27.4-49.8
Tumor number													
Single	105	38	106.5	73.6-97.2	24	81.5	57.0-88.0	16	45.0	28.3-76.5	27	55.0	43.4-69.6
Multiple (≥2)	42	10	69.0	50.2-94.8	13	43.0	29.4-75.6	7	27.0	7.4-65.8	12	21.5	16.7-58.3
Tumor differentiation													
I-II	82	28	107.5	72.6-99.2	19	84.0	64.2-92.8	13	76.0	31.8-85.2	22	54.0	35.7-64.3
III-IV	65	20	87.0	61.6-95.0	18	39.5	31.0-72.6	10	11.5	8.8-57.7	17	45.0	33.0-70.2
Tumor size													
≤5cm	57	24	82.5	59.6-89.8	10	93.0	62.5-104.5	7	84.0	42.1-110.7	16	69.5	50.3-80.9
>5cm	90	24	110.0	77.0-104.4	27	46.0	43.3-74.3	16	11.5	14.7-55.1	23	21.0	25.6-55.0
T stage													
T1-T2	106	43	100.0	72.0-94.0	24	85.5	63.2-91.4	13	82.0	44.2-95.6	26	64.0	46.8-74.6
T3-T4	41	5	100.0	43.4-117.8	13	24.0	21.3-66.3	10	10.5	4.0-33.0	13	21.0	16.2-45.2
Vascular invasion													
No	106	41	100.0	72.0-94.0	25	75.0	48.5-80.7	12	53.0	27.7-79.5	28	60.5	44.5-71.9
Yes	41	7	110.0	47.6-115.0	12	58.5	44.3-90.5	11	9.0	12.9-69.0	11	20.0	15.6-47.4
BCLC stage													
A-B	102	35	108.0	74.1-98.1	21	75.0	46.3-83.1	16	27.5	26.2-72.4	30	58.5	44.9-70.3
C	45	13	89.0	52.5-94.5	16	69.0	48.0-85.2	7	14.0	9.2-78.2	9	15.0	8.9-46.2

MST (m), Median survival time (months); 95%CI, 95% of confidence interval; NA, not available.

