Table S1 Different treatment in subculture

Number	Medium	Aux	CTK	
A	QL	0.05 mg/L NAA	1.0 mg/L 6-BA	0.5 mg/L GA_3
B	WPM	0.1 mg/L NAA	1.0 mg/L 6-BA	
C	MS	0.05 mg/L NAA	0.5 mg/L 6-BA	

Table S2 Different hormone concentrations in callus induction

Number	6-BA	TDZ	IBA	NAA	2,4-D
C1	0.2	0	0.1	0	0
C2	0.2	0	0.5	0	0
C3	0.2	0	1.0	0	0
C4	2.0	0	0.1	0	0
C5	2.0	0	0.5	0	0
C6	2.0	0	1.0	0	0
C7	4.0	0	0.1	0	0
C8	4.0	0	0.5	0	0
C9	4.0	0	1.0	0	0
D1	0.2	0	0	0.1	0
D2	0.2	0	0	0.5	0
D3	0.2	0	0	1.0	0
D4	2.0	0	0	0.1	0
D5	2.0	0	0	0.5	0
D6	2.0	0	0	1.0	0
D7	4.0	0	0	0.1	0
D8	4.0	0	0	0.5	0
D9	4.0	0	0	1.0	0
E1	0.2	0	0	0	0.1
E2	0.2	0	0	0	0.5
E3	0.2	0	0	0	1.0
E4	2.0	0	0	0	0.1
E5	2.0	0	0	0	0.5
E6	2.0	0	0	0	1.0
E7	4.0	0	0	0	0.1
E8	4.0	0	0	0	0.5
E9	4.0	0	0	0	1.0
F1	0	0.2	0.1	0	0
F2	0	0.2	0.5	0	0
F3	0	0.2	1.0	0	0
F4	0	2.0	0.1	0	0
F5	0	2.0	0.5	0	0
F6	0	2.0	1.0	0	0
F7	0	4.0	0.1	0	0
F8	0	4.0	0.5	0	0
F9	0	4.0	1.0	0	0
G1	0	0.2	0	0.1	0
G2	0	0.2	0	0.5	0
G3	0	0.2	0	1.0	0
G4	0	2.0	0	0.1	0
G5	0	2.0	0	0.5	0

G6	0	2.0	0	1.0	0
G7	0	4.0	0	0.1	0
G8	0	4.0	0	0.5	0
G9	0	4.0	0	1.0	0
H1	0	0.2	0	0	0.1
H2	0	0.2	0	0	0.5
H3	0	0.2	0	0	1.0
H4	0	2.0	0	0	0.1
H5	0	2.0	0	0	0.5
H6	0	2.0	0	0	1.0
H7	0	4.0	0	0	0.1
H8	0	4.0	0	0	0.5
H9	0	4.0	0	0	1.0

Table S3 The performance of MGM under different concentrations of 6-BA and IBA

number	hormone(mg/L)		leaf		Callus				
	6-BA	IBA	colour	state	induction rate	colour	density	transparency	volume
1	0.5	0.2	green	spread	85.00%	Brownish yellow	normal	thick and solid	small
2	0.5	0.5	green	spread	75.00%	light green	tight	thick and solid	medium
3	0.5	1.0	green	spread	91.33%	light green	tight	thick and solid	medium
4	2.0	0.2	green	spread	86.67%	light green	normal	thick and solid	small
5	2.0	0.5	green	spread	100%	Brownish yellow	tight	thick and solid	small
6	2.0	1.0	green	spread	76.67%	light green	tight	thick and solid	small
7	4.0	0.2	green	spread	86.33%	Brownish yellow	normal	transparent	small
8	4.0	0.5	green	spread	82.67%	Brownish yellow	tight	thick and solid	small
9	4.0	1.0	green	spread	100.0%	light green	tight	thick and solid	small

Table S4 The performance of MGM under different concentrations of TDZ and IBA

number	hormone(mg/L)		leaf		Callus				
	TDZ	IBA	colour	state	induction rate	colour	density	transparency	volume
1	0.5	0.2	green	spread	87.00%	Brownish yellow	normal	thick and solid	small
2	0.5	0.5	green	spread	80.50%	light green	normal	thick and solid	medium
3	0.5	1.0	green	spread	92.00%	light green	normal	thick and solid	medium
4	2.0	0.2	Partial Browning	spread	87.00%	light green	normal	thick and solid	small
5	2.0	0.5	green	spread	86.33%	light green	normal	thick and solid	medium
6	2.0	1.0	green	crimp	100.0%	light green	tight	thick and solid	big
7	4.0	0.2	green	spread	100.0%	light green	normal	thick and solid	medium
8	4.0	0.5	Partial Browning	spread	93.67%	light green	normal	thick and solid	medium
9	4.0	1.0	green	spread	91.67%	light green	tight	thick and solid	medium

Table S5 The performance of MGM under different concentrations of 6-BA and NAA

number	hormone(mg/L)		leaf		Callus				
	6-BA	NAA	colour	state	induction rate	colour	density	transparency	volume
1	0.5	0.2	green	spread	96.50%	light green	normal	thick and solid	small
2	0.5	0.5	Partial Browning	spread	77.50%	Brownish yellow	loose	transparent	small
3	0.5	1.0	green	spread	97.00%	light green	loose	transparent	big
4	2.0	0.2	green	spread	96.00%	light green	normal	thick and solid	medium
5	2.0	0.5	green	spread	96.50%	light green	tight	thick and solid	medium
6	2.0	1.0	green	crimp	86.50%	light green	tight	thick and solid	big
7	4.0	0.2	green	spread	100.0%	light green	normal	thick and solid	small
8	4.0	0.5	green	spread	95.33%	light green	tight	thick and solid	medium
9	4.0	1.0	green	spread	90.50%	light green	normal	thick and solid	medium

Table S6 The performance of MGM under different concentrations of TDZ and 2,4-D

number	hormone(mg/L)		leaf		Callus				
	TDZ	2,4-D	colour	state	induction rate	colour	density	transparency	volume
1	0.5	0.2	green	spread	95.67%	white	loose	transparent	medium
2	0.5	0.5	Partial Browning	spread	96.33%	white	loose	transparent	medium
3	0.5	1.0	green	spread	100%	light green	loose	transparent	small
4	2.0	0.2	Partial Browning	spread	97.67%	light green	normal	thick and solid	small
5	2.0	0.5	Partial Browning	spread	100%	light green	normal	thick and solid	small
6	2.0	1.0	green	spread	96.00%	light green	normal	thick and solid	medium
7	4.0	0.2	green	spread	97.67%	light green	normal	thick and solid	medium
8	4.0	0.5	green	spread	96.67%	Brownish yellow	normal	thick and solid	medium
9	4.0	1.0	Partial Browning	spread	95.67%	Brownish yellow	normal	thick and solid	small

Table S7 The performance of MGM under different concentrations of 6-BA and 2,4-D

number	hormone(mg/L)		leaf		Callus				
	6-BA	2,4-D	colour	state	induction rate	colour	density	transparency	volume
1	0.5	0.2	green	spread	100%	light green	loose	transparent	medium
2	0.5	0.5	green	spread	91.00%	white	loose	transparent	small
3	0.5	1.0	Partial Browning	spread	96.67%	Brownish yellow	loose	transparent	medium
4	2.0	0.2	green	spread	98.33%	light green	normal	thick and solid	medium
5	2.0	0.5	green	spread	98.33%	Brownish yellow	loose	transparent	small
6	2.0	1.0	Partial Browning	spread	100%	light green	loose	transparent	big
7	4.0	0.2	green	spread	93.33%	Brownish yellow	normal	thick and solid	small
8	4.0	0.5	Partial Browning	spread	97.00%	Brownish yellow	loose	thick and solid	small
9	4.0	1.0	green	spread	98.67%	Brownish yellow	normal	transparent	small

Table S8 The performance of MGM under different concentrations of TDZ and NAA

number	hormone(mg/L)		leaf		Callus				
	TDZ	NAA	colour	state	induction rate	colour	density	transparency	volume
1	0.5	0.2	Partial Browning	spread	96.00%	light green	normal	thick and solid	small
2	0.5	0.5	green	spread	100%	light green	tight	thick and solid	big
3	0.5	1.0	green	spread	98.00%	white	normal	thick and solid	small
4	2.0	0.2	green	spread	98.67%	light green	normal	thick and solid	small
5	2.0	0.5	green	spread	97.67%	light green	normal	thick and solid	small
6	2.0	1.0	green	crimp	97.33%	light green	tight	thick and solid	medium
7	4.0	0.2	green	spread	96.33%	light green	normal	thick and solid	small
8	4.0	0.5	green	spread	94.00%	light green	normal	thick and solid	medium
9	4.0	1.0	green	spread	96.67%	light green	tight	thick and solid	medium

Table S9 The sequence of gene primers was designed

Gene Name	Primer sequence
eYGFPuv-F	CACTATGGCAAGGTTCTCCTTGGT
eYGFPuv-R	AAACCACTGGCATTCTCTCCC
eYGFPuv-Q-F	CACTATGGCAAGGTTCTCCTTGGT
eYGFPuv-Q-R	CCAACTGAAGGACGGCTCTT
Ruby- F	GCTTCTTGCCCACCTCAAGGAT
Ruby- R	TGATCCTCGCGATCTGGTTCAT
Ruby -Q-F	GCTTCTTGCCCACCTCAAGGAT
Ruby -Q-R	TGATCCTCGCGATCTGGTTCAT
PMPDSPAM1-F	TGTGTCTCTGCTGCTAACTTGAGC
PMPDSPAM1-R	GCACACCACCTACACACCATTAC
PMPDSPAM2-F	CTACATAGAGCAGCCGGGTAATG
PMPDSPAM2-R	CCAAAGAATGGAATGAATTCCTGCAG

Table S10 The screening of PAM sites

sgRID	Start	End	CRISPR_target_sequence(5'-3')	Length(nt)	GC%	0M	1M	2M	3M	4M	5M	6M	7M	8M	9M	Total	Scorer2.0	CFD
MGMpds_A_26	286	308	TTCAACGGCTTAGCTGGACGAGG	23	56.52%	1	0	0	0	1	55	0	0	0	0	56	2.6539	0.3694
MGMpds_S_47	752	774	TGAGTGTAAAAGATTGGATGAGG	23	39.13%	1	0	0	1	20	195	0	0	0	0	216	2.5457	0.062
MGMpds_S_19	391	413	GAAGCAAGAGATGTTCTAGGCGG	23	52.17%	1	0	0	0	14	103	0	0	0	0	117	2.5206	0.1129
MGMpds_S_24	421	443	GCAGCATGGAAAGATAAGGATGG	23	47.83%	1	0	0	0	21	145	0	0	0	0	166	2.1783	0.0805
MGMpds_S_42	700	722	CTACTGCCAGCAATTCTTGGTGG	23	52.17%	1	0	1	0	9	76	0	0	0	0	86	1.9271	0.1012
MGMpds_S_45	727	749	GCTTATGTTGAAGCCCAAGATGG	23	47.83%	1	0	0	0	11	138	0	0	0	0	149	1.8198	0.0968
MGMpds_S_21	399	421	AGATGTTCTAGGCGGAAAGGTGG	23	52.17%	0	0	0	0	6	85	0	0	0	0	91	1.7811	0.234
MGMpds_A_29	269	291	ACGAGGAGAGGCTCGGAAAGTGG	23	60.87%	1	0	0	0	8	60	0	0	0	0	68	1.6581	0.159
MGMpds_A_33	187	209	TCAACGCAAACCACCTTCAAAGG	23	47.83%	0	0	0	1	10	97	0	0	0	0	108	1.5361	0.1783
MGMpds_A_36	148	170	GGCCTTCCATAAATAGCTTGTGG	23	47.83%	1	0	0	0	26	210	0	0	0	0	236	1.3265	0.1624
MGMpds_S_35	572	594	GCAAACCAGGAGAGTTCAGCCGG	23	60.87%	1	0	0	0	4	58	0	0	0	0	62	1.1972	0.2336
MGMpds_A_27	281	303	CGGCTTAGCTGGACGAGGAGAGG	23	65.22%	1	0	0	0	4	30	0	0	0	0	34	1.1635	0.3454
MGMpds_S_23	417	439	GGTGGCAGCATGGAAAGATAAGG	23	52.17%	1	0	0	1	11	144	0	0	0	0	156	0.7332	0.0847
MGMpds_S_51	786	808	ACCGGATCGAGTGACTACTGAGG	23	56.52%	1	0	0	0	0	24	0	0	0	0	24	0.5213	0.4481
MGMpds_S_25	428	450	GGAAAGATAAGGATGGAGACTGG	23	47.83%	1	0	0	2	25	252	0	0	0	0	279	0.502	0.0403
MGMpds_S_22	407	429	TAGGCGGAAAGGTGGCAGCATGG	23	60.87%	0	0	0	0	11	85	0	0	0	0	96	0.4984	0.2037
MGMpds_S_5	152	174	AAGCTATTTATGGAAGGCCGAGG	23	47.83%	1	0	0	0	1	63	0	0	0	0	64	0.4965	0.1699
MGMpds_S_49	760	782	AAAGATTGGATGAGGAAACAGGG	23	43.48%	0	0	1	3	56	276	0	0	0	0	336	0.3939	0.0381
MGMpds_S_8	177	199	TGGTGCTTGCCCTTTGAAGGTGG	23	56.52%	0	0	0	0	13	76	0	0	0	0	89	0.362	0.1625
MGMpds_S_50	768	790	GATGAGGAAACAGGGCATACCGG	23	56.52%	0	0	0	0	5	79	0	0	0	0	84	0.2672	0.1796
MGMpds_A_18	577	599	TCAAACCGGCTGAACTCTCCTGG	23	56.52%	1	0	0	1	1	21	0	0	0	0	23	0.2458	0.4592
MGMpds_S_6	157	179	ATTTATGGAAGGCCGAGGAATGG	23	47.83%	1	0	0	1	5	77	0	0	0	0	83	0.2185	0.1527
MGMpds_S_3	142	164	TTAAGCCCACAAGCTATTTATGG	23	39.13%	1	0	0	1	7	112	0	0	0	0	120	0.2162	0.1253
MGMpds_A_35	169	191	AAAGGGCAAGCACCATTCCTCGG	23	56.52%	1	0	2	1	2	67	0	0	0	0	72	0.0658	0.216
MGMpds_S_9	288	310	TCGTCCAGCTAAGCCGTTGAAGG	23	56.52%	1	0	0	0	2	25	0	0	0	0	27	0.0521	0.4718
MGMpds_A_17	591	613	AAACTTCAGGGAAATCAAACCGG	23	43.48%	1	0	0	0	20	200	0	0	0	0	220	0.0445	0.0703
MGMpds_A_14	616	638	CATATTCCATTTAAGGGTGCTGG	23	43.48%	0	0	0	0	6	89	0	0	0	0	95	0.0129	0.1359
MGMpds_S_37	617	639	CAGCACCCTTAAATGGAATATGG	23	43.48%	0	0	0	0	11	186	0	0	0	0	197	-0.0205	0.2232
MGMpds_A_9	706	728	GCCTGCCCACCAAGAATTGCTGG	23	60.87%	1	0	0	0	2	45	0	0	0	0	47	-0.1098	0.1473