Supplementary Materials

Table S1. The primers of DACH1 sequence deletion and mutation vector construction.

Vector	Sense primer (5'-3')	Antisense primer (5'-3')
pGL3-DACH1-dS1	TAGGGGTACCAAGGACTTTCCAAAACTACAGC	
pGL3-DACH1-dS2	TAGGGGTACCCATCCACATCAAGGCAAGC	GCGAAGATCTCACAAAAGTGTCCCGCAAG
pGL3-DACH1-dS3	TAGGGGTACCCCACTTGAAAACTGTCCTG	
pGL3-DACH1-dS4		GCGAAGATCTCTGGACGAGTTGTTGTTGT
pGL3-DACH1-dS5		GCGAAGATCTAGAGGGAGCGTGCGAGG
pGL3-DACH1-dS6	TAGGGGTACCAAGGACTTTCCAAAACTACAGC	GCGAAGATCTCTTCTCTTCTACTACTACCGTTA
pGL3-DACH1-dS7		GCGAAGATCTCTAAACAATCGCCCGCC
pGL3-DACH1-dS8		GCGAAGATCTGTAAGCAAAGCGTAATGTTC
pGL3-DACH1-mS1	CGAGTTCatacgtaGATAATTTGGGTTAATACTAGTGAGT	AATTATCtacgtatGAACTCGGAGCAGAGACTCCG
pGL3-DACH1-mS2	CGGAGTCgagtagaCGAGTTCCTGGTTGGATAATT	GAACTCGtctactcGACTCCGAGAGCGCGAGA
pGL3-DACH1-mS3	TCTCTGCTCatctggaCTGGTTGGATAATTTGG	TCCAACCAGtccagatGAGCAGAGACTCCGAGAGC
pGL3-DACH1-mS4	TTCCTGGTTGtcgccggTGGGTTAATACTAGTGAGTGAGGT	TTAACCCAccggcgaCAACCAGGAACTCGGAGC
pGL3-DACH1-mS5	GATAATTgtttggcATACTAGTGAGTGAGGTTTTTGC	ACTAGTATGCCAAACAATTATCCAACCAGGAACTCGG

Note：Lowercases in primer sequence represent mutation sites.

Table S2. The primers for DACH1 shRNA lentivirus vectors

Vector	Sense primer (5'-3')	Antisense primer (5'-3')
DACH1-shRNA01	GATCCGCCTCCTAAGAGGACTCAACTTCCTGTCAGATTG	AATTCAAAAAGCCTCCTAAGAGGACTCAATCTGACAGGAAGTTG
DACH1-shRNA02	GATCCGCACTTGAGTTTGAGACGACTTCCTGTCAGA	AATTCAAAAAGCACTTGAGTTTGAGACGATCTGACAGGAAGTCGT
DACH1-shRNA03	GATCCCTGTTGAAAGTTGCCATAGCTTCCTGTCAGACTA	AATTCAAAAACTGTTGAAAGTTGCCATAGTCTGACAGGAAGCTAT

Table S3. The primers for DACH1 SUMOylation site-directed mutation

Primer	Sequence (5'-3')
DACH1-mSF1	AAGGTGAAAAAAATCagaTTAGAAGCCAT
DACH1-mSR3	AGTTGCTCATGGCTTCTAAtctGATT
DACH1-mSF1	CTGGAAAAAACTGAGCTGaggATGGATTT
DACH1-mSR1	TCTTTCCCTTAAAAAATCCATcctCAGCTC
DACH1-mSF1	TAGTTCAAAAGAGGCTAaggAAGGAG
DACH1-mSR2	TGCCTTCTTCTCCTTcctTAGCCT

Note: Lowercases in the sequence represent the lysine to be mutated.

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-2000  CATATTTCTATTTTTCGGTAGACAGTTCCTGCACTATTTGACACTGCGATTCACAGAGTTCAAAGGCTTAAAATGATATAGAGAAATGTG
-1910  ATCATTTCAACACCAGAATGGCAAAAATTTTATTATAAAATTTCCCAACCCTGTGAACCTGCTACTAACAGTTTATTTTAAAAATCTGTC
-1820  AAATGCTAAAGCATTGCTTCATATCTTATGAACTTACTGAACATGTGTGGACCGGTTCAAAGGCTAACTAATTGAAGATACTTGGAGAC
-1731  ATGAGCAGCAAATAGATTTGACCCATATTCAAATGATATGTTAGTCAAAAATCCTTGAATAAATACTTCAGTGCAACAAGTTAGAAAA
                                                  AP-1 binding site
-1648  GAAAAGAAAAGGAAAGAGGAAGGAAAGGAGGAATAGAGTCAGTCTAAACTCAGCCTCATGTTGTTTTAAGCACAGCTACCCAAGT
                                              AP-1 binding site
-1558  CTTTACAAGTCAACTAGTGAGCTTTGTTTTTGTTCTTCCCATTATTTACAAAACATATATTTACTGACAAATTGAAAAGGACTTTCCAAA
            AP-1 binding site
-1468  ACTACAGCAGCACTTTTCAAACATGAAAAAAAAAAAAAAAAAAACTATTGTGTTGTCCAAAAAACACATTAGCAATTGGCTTTGGGTC
-1381  TTAAAGGACATGAGGATAGTTGGTTACTGTGTAAGACAGGTGAATTAATTATAGAGTTTTGGGTAAGAAAACCCTTTTTCCACTTTCTA
-1648  AATCTTCAAGGATACCTTATCTCCTTGATAGCTCTAGGTTTAACAGGTATTTCTGACTGGCTTTTGGGGAGACAGTGAAGTTATTCTAA
                                                                 CAAT box
-1292  ATCATCCACATCAAGGCAAGCATTTCTTTCCACAACCTATTAGGAAATATGGAATTGAATACAGAGCTTTCCATTATTCTTAAGCGATTT
-1113  CGGACTGACTTTCTTCTCACCACTTGAAAACTGTCCTGGAATTTTCACTATCTTTATATAAATAAATAATTTAGTAGAGAAATAAACAA
            AP-1 binding site                                          TATA box
-1024  TCAGATGCAAAAGAACATTACGCTTTGCTTACATGTGAATTTTCCTCAAAATAATTTCTGAATAATCGTGAAGTGGGGGCTGTGTTTTCG
 -934  TTTCTAGCTCATTGCCAAAACGCGTGGAGATGGATCCTAAATCCTGGAAGGAGAGAGCTCGGCGCGCTCAGGCTCCTCTTTAAGTTGG
                                                                             similar with Kip2-TRE
 -846  CGGGCGATTGTTTAGAAGCTTTGGAAAAAAATTACCAGTCCCCGCGGACGAAATGGAATGTGAGACATGCAATCTAACGGTAGTAGTA
                                                 similar with IP-TRE
 -759  GAAGAGAAGTAGATGATCTCCCTCTCCTTTTTCCGATCGCCACTTCTGTGTCCCCGGCTTTTCCTCTCCGTCCCTCCCACAGTTTCTTTC
            NF-κB binding site    similar with Kip2-TRE
 -670  CGTATCCTCCCCCTCCCCTCCTCCTTTCCTCGCACGCTCCCTCTCCAGTGTCTCGCGCTCTCGGAGTCTCTGCTCCGAGTTCCTGGTTGG
                                                                                  similar with IP-TRE
 -580  ATAATTTGGGTTAAATACTAGTGAGTGAGGTTTTGCGGCTTCAAAGGGTATTTCAAGTTTCCGGAGCTCCTCCCCTCTGCACCGTGTGAC
 -490  AACAACAACTCGTCCAGCCGGCAGCCTGCACTTTTCAGCTCATTTTCTCTCTGTCATTCCCCTCTCAATCTTTGATCAATGTACTTGCCA
 -400  GGGAGAGCCCAAGTCCTTCAAACCTCCTCCTTTTCACCTTCATCGTTAACTTTGTGCTAGAGCGAGACCCACACAACAACAGCCGACC
 -312  CTCCCCGCCCCACCCCCACCCCCAAAACCAGCCCTCGATCCCAGCCCCCGGAGAGGACTCGCATTTCGACTTGCGGGACACTTTTGTG
            GC box
 -225  CGTTCCTCTCCAGAGCGCCTCTCGTGCTCGCCCCTCTTGCGCTCGCTCTTTATTACCTTCACCTCCTTTTCTCCCCCTTCTCTCTCCCTTTCTC
 -133  CTTCTCGTTCTCTCCCCGGAGTTGTTGTTGCCCCCCTCGCTCCTTCTCCCCCCTTTTTTCCCCTTCCCCTCCCGGGGGTGTGTGGCAACTTT
  -42  TCCTCTCGCTTCTCCTCCGTCTGTTTCCCCTTATATGTGACCATGGCAGTGCCGGCGGCTTTGATCCCTCCGACCCAGCTGGTCCCCCCT
                                                   translation initiation site
 +49  CAACCCCCAATCTCCACGTCTGCTTCCTCCTCTGGCACCACCACCTCCACCTCTTCGGCGACTTCGTCTCCGGCTCCTTCCATCGGACC
+138  CCCGGCGTCCTCTGGGCCAACTCTGTTCCGCCCGGAGCCCATCGCTTCGGCGGCGGCGGCGGC
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Figure S1. Promoter sequences of *DACH1*. The underlines in sequences are regulatory elements or compared with Kip2-TRE or IP-TRE.
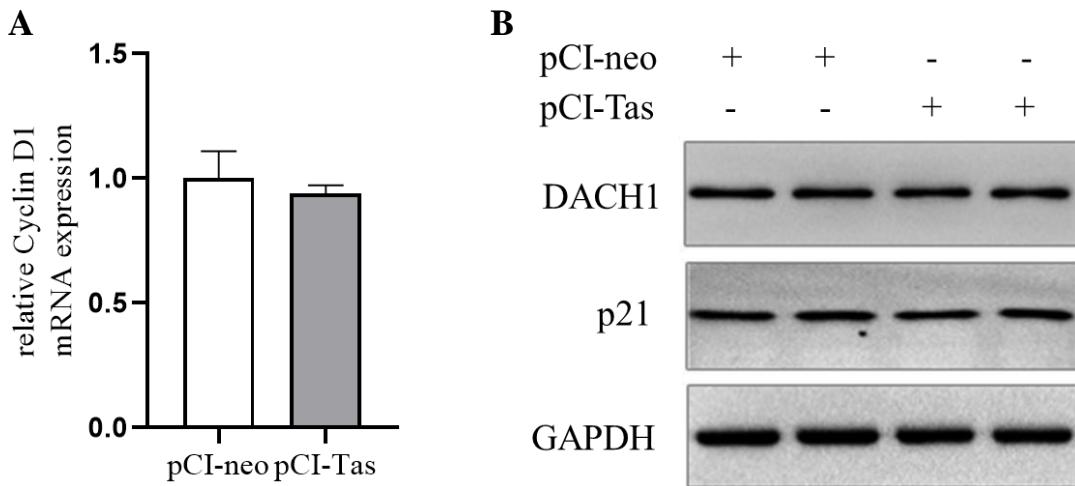

Figure S2. The mRNA expression of Cyclin D1 and protein expression of p21 after pCI-Tas transfection. (A)The mRNA expression of Cyclin D1 was unchanged after Tas transfection. HeLa cells were plated in a 12-well plate at $2×10^5$, pCI-neo (1 μg) or pCI-Tas (1 μg) was transfected into the cells, and RT-qPCR was utilized to detect the mRNA expression of Cyclin D1. (B) Tas transfection had no influence on the protein expression of p21. HeLa cells were plated in a 6-well plate at $5×10^5$, and transfected with pCI-neo (3 μg) or pCI-Tas (3 μg). After 48 h of transfection, the protein of cells was extracted and western blot was performed to assess the protein expression of p21, DACH1, and GAPDH.