

## **Supplementary material**

**Table S1.** Binding parameters for the interaction between MIR167A or its mutant alleles and DBD of MoCdc5, TvMyb2, or AtCdc5 by BLI.

**Table S2.** Binding parameters of the interaction between MoCdc5-DBD or its mutant alleles and U6 RNA by BLI.

**Table S3.** PCR primers used in this study.

**Figure S1.** DBDs of Myb and Cdc5 contact with distinct DNA sequences. (a) In Myb-DNA complex structures, several positively charged residues on the second and third helices, including R84, R87, R89, K138, and T143 in TvMyb2, and K128, E132, R133, N179, and T188 in c-Myb, contact with DNA directly. (b) DBDs of Cdc5 and Myb specifically interact with a CTCAGCG motif and a AAC(G/T)G motif, respectively, suggesting that Cdc5 is not a canonical Myb domain protein.

**Figure S2.** Circular dichroism (CD) spectra of MoCdc5-DBD and its mutant alleles show standard  $\alpha$ -helix characteristics. CD spectra of MoCdc5-DBD and its mutated alleles were all nearly superimposable from 195 nm to 260 nm. The experiment was recorded at a concentration of 0.2 mg/mL proteins in 20 mM MES (pH 6.0) and 150 mM NaCl. CD wavelength scans were collected between 195 nm to 260 nm using a 1-mm quartz cuvette.

**Figure S3.** Six conserved aromatic residues of MoCdc5-DBD play important roles in maintaining its structural stability. (a) Schematic representation of the structure of the first HTH motif (containing  $\alpha$ 1- $\alpha$ 3) and second HTH motif (containing  $\alpha$ 4- $\alpha$ 6) showing the spatial locations of six conserved aromatic residues, W9, W29, W48, W61, W80, and Y98 in MoCdc5-DBD. These six aromatic amino acids are arranged regularly, forming the hydrophobic core and are responsible for the structure and stability of the two HTH motifs. (b) CD spectra of MoCdc5-DBD and its mutant alleles at six conserved aromatic residues, W9, W29, W48, W61, W80, and Y98.

**Figure S4.** Point mutations of the five amino acid residues involved in DNA binding do not abolish expression level and stability of AtCdc5. Protein expression levels of Myc-Cdc5 and heat shock protein Hsc70 (loading control) from different transgenic *cdc5-2* lines were detected by western blot analysis. The primary antibodies, anti-Myc and anti-Hsc70, were used for western blot analysis.

**Figure S5.** Sequence alignment of Cdc5 and Myb proteins at the 100th amino acid. The 100th amino acids in Cdc5 proteins are mainly those with long side chains, that is, lysine, phenylalanine and tyrosine, which is different from that of Myb proteins. Red dotted lines show the boundary of Cdc5 and Myb. The 100th amino acids in Cdc5 and Myb proteins are highlighted in yellow and green, respectively.

**Figure S6.** Model of MoCdc5-DBD with two distinct nucleic acid-binding surfaces.

Cdc5-DBD has two distinct nucleic acid-binding surfaces, one binding DNA similar to Myb-DBD and the other one participating in RNA binding.

**Table S1.** Binding parameters for the interaction between MIR167A or its mutated alleles and DBD of MoCdc5, TvMyb2, or AtCdc5 by BLI.

Name	DNA sequences					
	MIR167A			MSE(167A)		
	KD* (M, e-08)	K <sub>on</sub> (1/Ms, e+04)	K <sub>off</sub> (1/s, e-03)	KD (M, e-08)	K <sub>on</sub> (1/Ms, e+04)	K <sub>off</sub> (1/s, e-03)
MIR167A		TGT <u>CTCAGCGGTGGAG</u>				
MSE (167A)		TGT <u>ACAACGGGTGGAG</u>				
MIR167A-1		TGT <u>ACAAGCGGTGGAG</u>				
MIR167A-2		TGT <u>CTTCACGGTGGAG</u>				
MIR167A-3		TGT <u>CTCATATGTGGAG</u>				
	MIR167A			MSE(167A)		
	KD (M, e-08)	K <sub>on</sub> (1/Ms, e+04)	K <sub>off</sub> (1/s, e-03)	KD (M, e-08)	K <sub>on</sub> (1/Ms, e+04)	K <sub>off</sub> (1/s, e-03)
MoCdc5-DBD	5.17±2.13	7.23±1.96	3.12±0.75	63.82±17.39	1.27±0.67	7.14±3.38
Cdc5-DBD	8.98±0.9	25.93±0.82	23.27±2.08	27.73±0.24	26.28±0.32	72.88±1.5
TvMyb-DBD	66.76±3.44	1.6±0.039	10.74±0.41	70.81±3.32	1.62±0.042	11.51±0.45
	MIR167A-1			MIR167A-2		
	KD (M, e-08)	K <sub>on</sub> (1/Ms, e+04)	K <sub>off</sub> (1/s, e-03)	KD (M, e-08)	K <sub>on</sub> (1/Ms, e+04)	K <sub>off</sub> (1/s, e-03)
MoCdc5-DBD	17.01±4.71	11.43±2.73	17.86±2.11	19.05±5.08	9.58±0.39	18.19±4.76
AtCdc5-DBD	13.75±2.04	4.93±3.09	7.66±4.54	15.14±1.69	6.84±0.34	10.38±1.47
TvMyb-DBD	71.26±4.22	1.56±0.04	11.15±0.4	73.09±2.83	1.65±0.05	12.04±0.48
	MIR167A-3					
	KD (M, e-08)	K <sub>on</sub> (1/Ms, e+04)	K <sub>off</sub> (1/s, e-03)	KD (M, e-08)	K <sub>on</sub> (1/Ms, e+04)	K <sub>off</sub> (1/s, e-03)
MoCdc5-DBD	20.89±5.15	8.83±0.75	17.99±3.37			
AtCdc5-DBD	12.93±1.24	7.01±0.35	9.09±1.19			
TvMyb-DBD	67.48±4.38	1.63±0.04	11.01±0.43			

\*KD, equilibrium dissociation constant. The experiments were repeated three times. Shown values are means ± s.d. of three experiments.

**Table S2.** Binding parameters of the interaction between MoCdc5-DBD or its mutated alleles and U6 RNA by BLI.

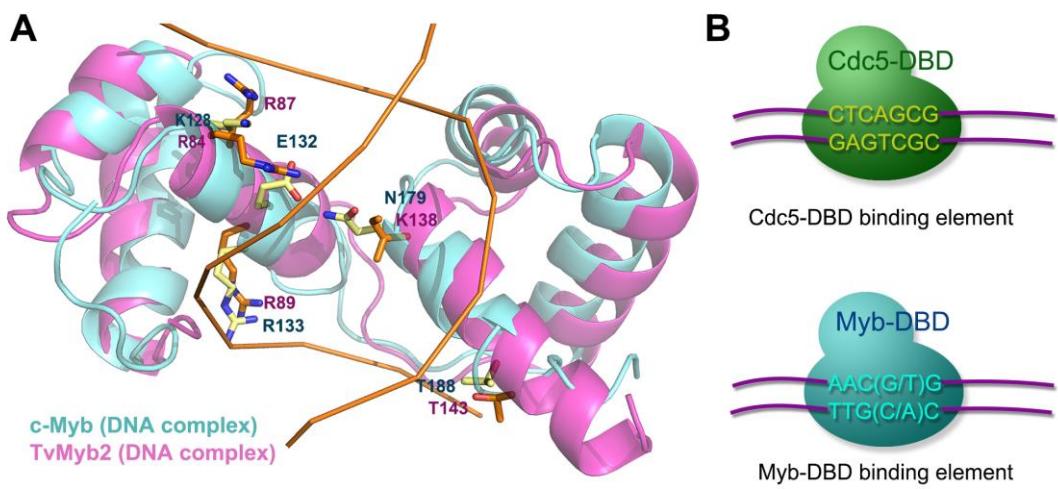
	KD* (M, e-08)	K <sub>on</sub> (1/Ms, e+04)	K <sub>off</sub> (1/s, e-03)
MoCdc5-DBD	1.38 ±0.05	3.85 ±0.03	0.53 ±0.02
MoCdc5-DBD <sup>R31M</sup>	#ND	#ND	#ND
MoCdc5-DBD <sup>R38N</sup>	4.10 ±0.06	6.92 ±0.08	2.84 ±0.02
MoCdc5-DBD <sup>K42A</sup>	2.80 ±0.07	5.51 ±0.08	1.54 ±0.03
MoCdc5-DBD <sup>K100A</sup>	1.63 ±0.05	5.20 ±0.07	0.84 ±0.02

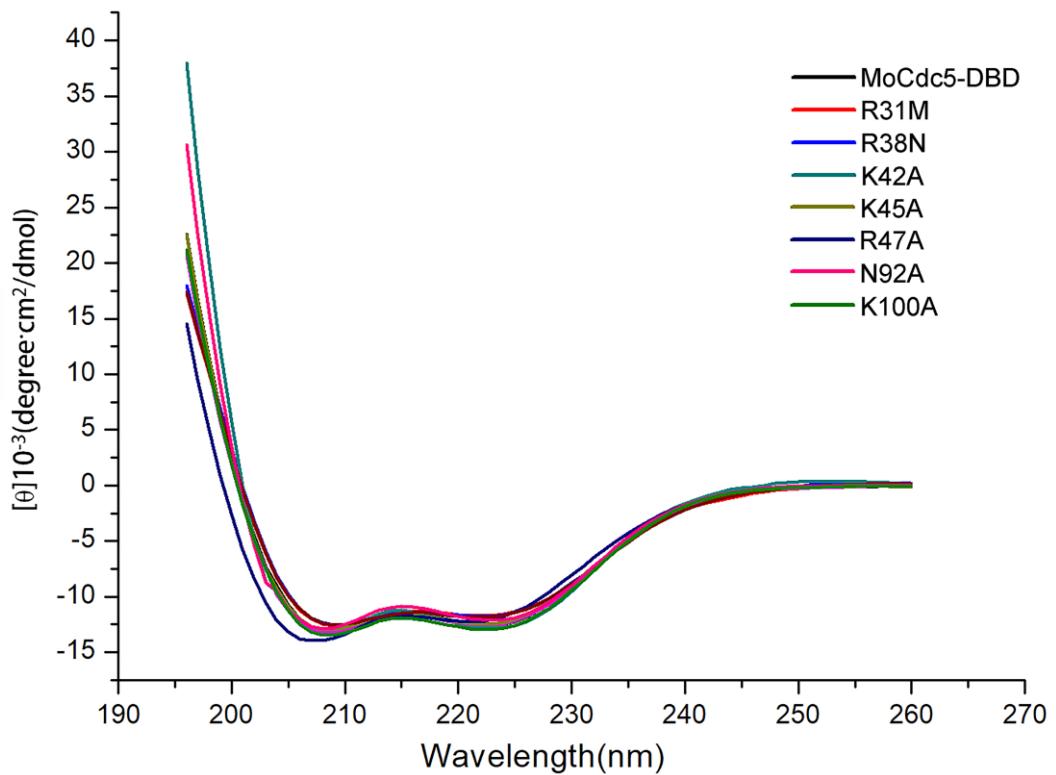
\*KD, equilibrium dissociation constant. The experiments were repeated three times. Shown values are means ± s.d. of three experiments. #ND, not determined due to the small binding affinity. Shown values are means ± s.d. of three experiments.

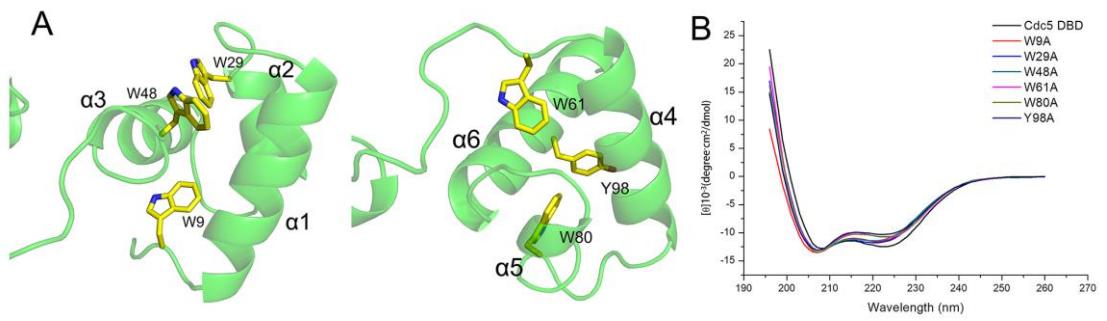
**Table S3.** PCR primers used in this study.

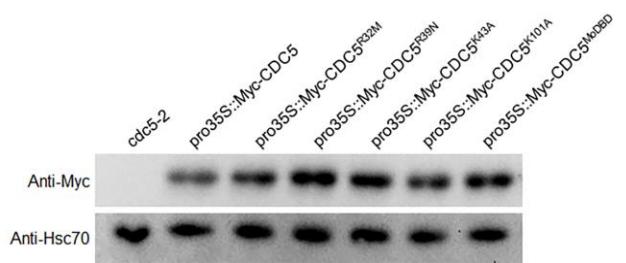
Primer name	Description	Sequence 5' to 3'
CDC5-TOPO-F	CDC5 CDS cloning	CACCATGAGGATTATGATTAAGGG
CDC5-TOPO-R	CDC5 CDS cloning	TGCAGAACGCTTCCATGGCTATGG
MoCDC5 -DBD -F1	MoCDC5 DBD cloning	CATGCCCTGTCGTCAAAGGAGG
MoCDC5-DBD -F2	MoCDC5 DBD cloning	CCTGTCGTCAAAGGAGGAGTTT
MoCDC5-DBD -R1	MoCDC5 DBD cloning	GTCAGTGGTACCCATTAGTAAC
MoCDC5 -DBD -R2	MoCDC5 DBD cloning	TCGAGTCAGTGGTACCCATTAGT
MoCdc5_R31M_F	R31M mutation	TTGAATCAATGGCAATGGTCTCGTCACTGCTG
MoCdc5_R31M_R	R31M mutation	CAGCAGTGACGAGACCATTGCCATTGATTCAA
MoCdc5_R38N_F	R38N mutation	TCGTCACTGCTGGCGAACAGACGCCAAAGCAG
MoCdc5_R38N_R	R38N mutation	CTGCTTGGCGTCTTCTGCCAGCAGTGACGA
MoCdc5_K42A_F	K42A mutation	GCGCGCAAGACGCCAGCGCAGTGCAAGGCCGA
MoCdc5_K42A_R	K42A mutation	TCGCGCCTTGCAGTGCCTGGCTTGGCGCG
MoCdc5_K45A_F	K45A mutation	ACGCCAAAGCAGTGCCTGGCGCGATGGAACCGAG
MoCdc5_K45A_R	K45A mutation	CTCGTTCCATCGGCCGCAGTGCCTTGGCGT
MoCdc5_R47A_F	R47A mutation	AAGCAGTGAAGGCCGTGGAACGAGTGGCTG
MoCdc5_R47A_R	R47A mutation	CAGCCACTCGTCCACGCCCTGCACTGCTT
MoCdc5_N92A_F	N92A mutation	GTGGGCCGCACGGCGGCCAGTGCCTTGAGCGC
MoCdc5_N92A_R	N92A mutation	GCGCTCAAGGCAGTGGCCGCCGTGCGGCCAC
MoCdc5_K100A_F	K100A mutation	CTTGAGCGCTACCAGCGCTTCTGACGAGGCC
MoCdc5_K100A_R	K100A mutation	GGCCTCGTCGAGAACGCCCTGGTAGCGCTAAG

CDC5_R32M_F	R32M mutation	AACGAGAAAGAGACGAGATCATAGCCCATTGGTCTTACCA
CDC5_R32M_R	R32M mutation	TGGTAAGAACCAATGGGCTATGATCTCGTCTTCGTT
CDC5_R39N_F	R39N mutation	TTACACTGTTAGCAGACTTATAACGAGAAGAGACGAGATCCG
CDC5_R39N_R	R39N mutation	CGGATCTCGTCTTCGTTAATAAGTCTGCTAACAGTGAA
CDC5_K43A_F	K43A mutation	CAGCGAGCTTACACTGTGCAGCAGACTTACGAACGAGAA
CDC5_K43A_R	K43A mutation	TTCTCGTTCGTAAGTCTGCTGCACAGTGTAAAGCTCGCTG
CDC5_K101A_F	K101A mutation	GCATGCTGCATCAAGGAGCGCCTCATACCTCTAAGACAT
CDC5_K101A_R	K101A mutation	ATGTCTTGAGAGGTATGAGGCCTCTGATGCAGCATGC
CDC5_MoDBD_F	Mosaic CDC5	CACCATGCCTGTCGTCAGGAGGGTTTG
CDC5_MoDBD_R	Mosaic CDC5	ATAATTTCATCCTTAGTGCAGGCCCGTCGAGAACGCT
AtCDC5_infusion_F	Mosaic CDC5	AGCTTCTCGACGAGGCCTGCACTAAGGATGAAAATTATGATGC
AtCDC5_infusion_R	Mosaic CDC5	AGCTGGGTCGGCGCGTGCAGAACGCTTCATGGC
MIR158a qF	Pri-MIR158a	GTGATGACGCCATTGCTCTT
MIR158a qR	Pri-MIR158a	TGTGACTTTAGATGCCCTGTTCA
MIR167a qF	Pri-MIR167a	TGTTGTGTTCATGACGATGG
MIR167a qR	Pri-MIR167a	AGCTCACAAATCAGACTGAAGA
MIR171a qF	Pri-MIR171a	CCGCGCCAATATCTCAGTA
MIR171a qR	Pri-MIR171a	TGTCTCCATTCAACACACACA
MIR172b-F	Pri-MIR172b	TATTAAGGACTTGTAGGACTCA
MIR172b-R	Pri-MIR172b	TAATAGTACGTACACATAAATGG
miR156a stem loop RT	miR156a	GTTGGCTCTGGTGCAGGGTCCGAGGTATTCGACCAGAGCCAACGTGC TC
miR156a forward	miR156a	GCGGCGGTGACAGAACAGAGT
miR167a stem-loop RT	miR167a	GTTGGCTCTGGTGCAGGGTCCGAGGTATTCGACCAGAGCCA ACTAGATC
miR167a Forward	miR167a	GGCGTC TGAAGCTGCCAGCAT
miR172a stem-loop RT	miR172a	GTTGGCTCTGGTGCAGGGTCCGAGGTATTCGACCAGAGCAACATGCA G
miR172a forward	miR172a	GGCGTCAGAACATTGATGATG
miR173 stem-loop RT	miR173	GTTGGCTCTGGTGCAGGGTCCGAGGTATTCGACCAGAGCCAACGTGA TT
miR173 forward	miR173	GTTGGC TTCGCTTGCAGAGAG
U6 stem loop RT	U6	GTGCAGGGTCCGAGGTTTGGACCATTCTCGAT
U6 forward	U6	GGAACGATACAGAGAACATTAGCA
Universal		GTGCAGGGTCCGAGGT









## Cdc5

;; : \* : \* : \*\*  
TEWSREEDEKLLHLAKLMLPTQWRTIAPIV-GRTATQCLERYQKLLDDLEAKENE-----  
Cdc5 [Homo sapiens]XP\_0020885  
Cdc5 [Danio rerio]NP\_957378  
Cdc5 [Drosophila melanogaster]NP\_612033  
CEF1/Cdc5 [Magnaporthe oryzae]MoCdc5  
CEF1/Cdc5 [Gaeumannomyces triticij]XP\_009224657  
CEF1/Cdc5 [Cordyceps militaris]XP\_006669491  
CEF1/Cdc5 [Cordyceps fumosorosea]XP\_018703643  
CEF1/Cdc5 [Metarhizium brunneum]XP\_014548153  
CEF1/Cdc5 [Metarhizium robertsii]XP\_007821244  
Cdc5 [Nectria haematococca]XP\_003046050  
CEF1/Cdc5 [Metarhizium acridum]XP\_007812759  
Cdc5 [Pochonia chlamydosporia]XP\_018140749  
Cdc5 [Purpureocillium lilacinum]XP\_018183500  
Cdc5 [Trichoderma gamsii]XP\_018660312  
cdc5 [Fusarium fujikuroi]XP\_023426203  
Cdc5 [Fusarium verticillioides]XP\_018751930  
Cdc5 [Fusarium graminearum]XP\_011327880  
Cdc5 [Beauveria bassiana]XP\_008593787  
Cdc5 [Verticillium alfalfae]XP\_003001229  
CEF1/Cdc5 [Capronia coronata]XP\_007721944  
Cdc5 [Nannizia gypsea]XP\_003175633  
Cdc5 [Sphaerulina musiva]XP\_016757376  
Cdc5 [Neurospora tetrasperma]XP\_009849953  
Cdc5 [Sporothrix schenckii]XP\_016582816  
Cdc5 [Pestalotiopsis fici]XP\_007831396  
Cdc5 [Pseudogymnoascus verrucosus]XP\_018134166  
Cdc5 [Colletotrichum higginsianum]XP\_018161088  
Cdc5 [Rhodotorula toruloides]XP\_016275372  
Cdc5 [Rasamonia emersonii]XP\_013323646  
Cdc5 [Quercus suber]XP\_023883131  
CDC5 [Moesziomyces antarcticus]XP\_014655541  
CDC5 [Arabidopsis thaliana]OAP18307  
Myb105 [Arabidopsis thaliana]OAP17137  
Myb117 [Arabidopsis thaliana]NP\_001154369  
Myb52 [Arabidopsis thaliana]OAP15473  
Myb-like protein [Arabidopsis thaliana]AAM63729  
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Myb [Arabidopsis thaliana]BAB09579  
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Myb 3R-5 [Arabidopsis thaliana]NP\_568099  
PC-Myb2 [Arabidopsis thaliana]OAO97786  
Myb1 [Arabidopsis thaliana]NP\_187534  
Myb25 [Arabidopsis thaliana]OAP07935  
Myb2a [Danio rerio]NP\_001296755  
Myb10 [Arabidopsis thaliana]NP\_187888  
Myb 18 [Arabidopsis thaliana]NP\_001328550  
Myb 66 [Arabidopsis thaliana]NP\_001331611  
Myb2 [Trichomonas vaginalis]XP\_001318894  
Myb3R-4 [Arabidopsis thaliana]OAO92063  
Myb [Arabidopsis thaliana]CAB87711

## Myb

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