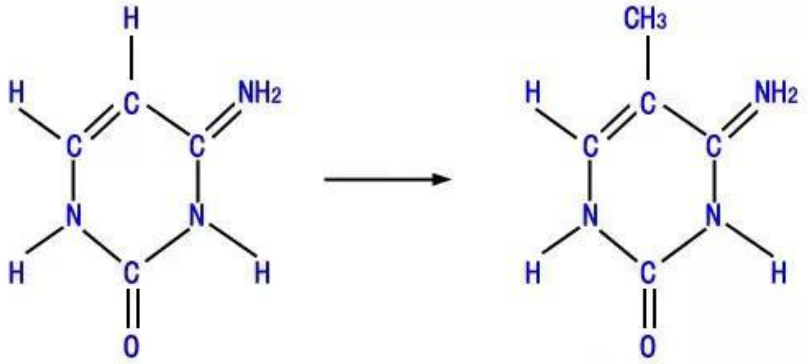
Function analysis of a DNA phosphatase APE1 in *Arabidopsis*

拟南芥 DNA 磷酸酶 APE1 的功能分析

By 第一小组

王礼鹏、朱思雨、杨双双、李金超

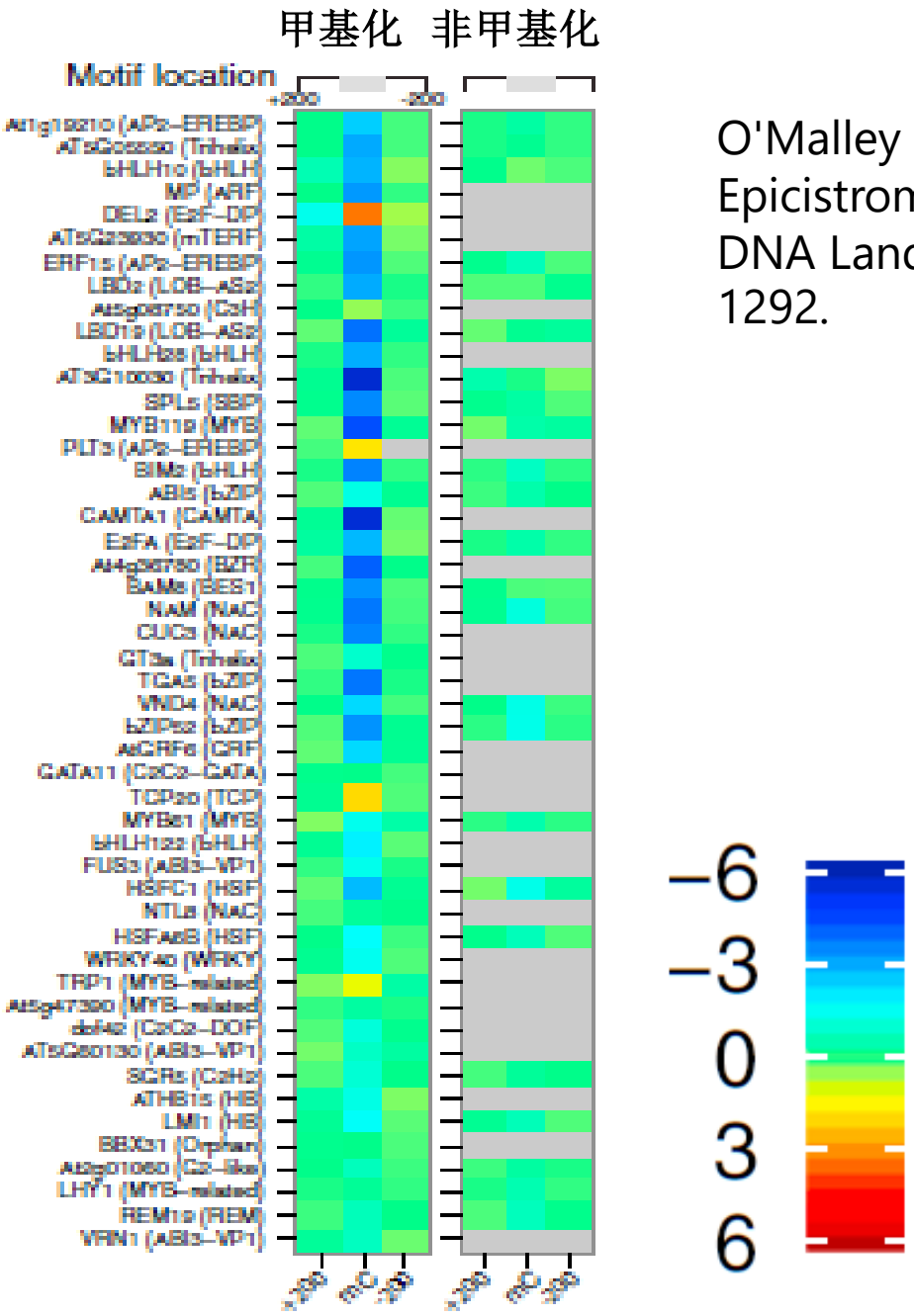
表观遗传学系列之 甲基化



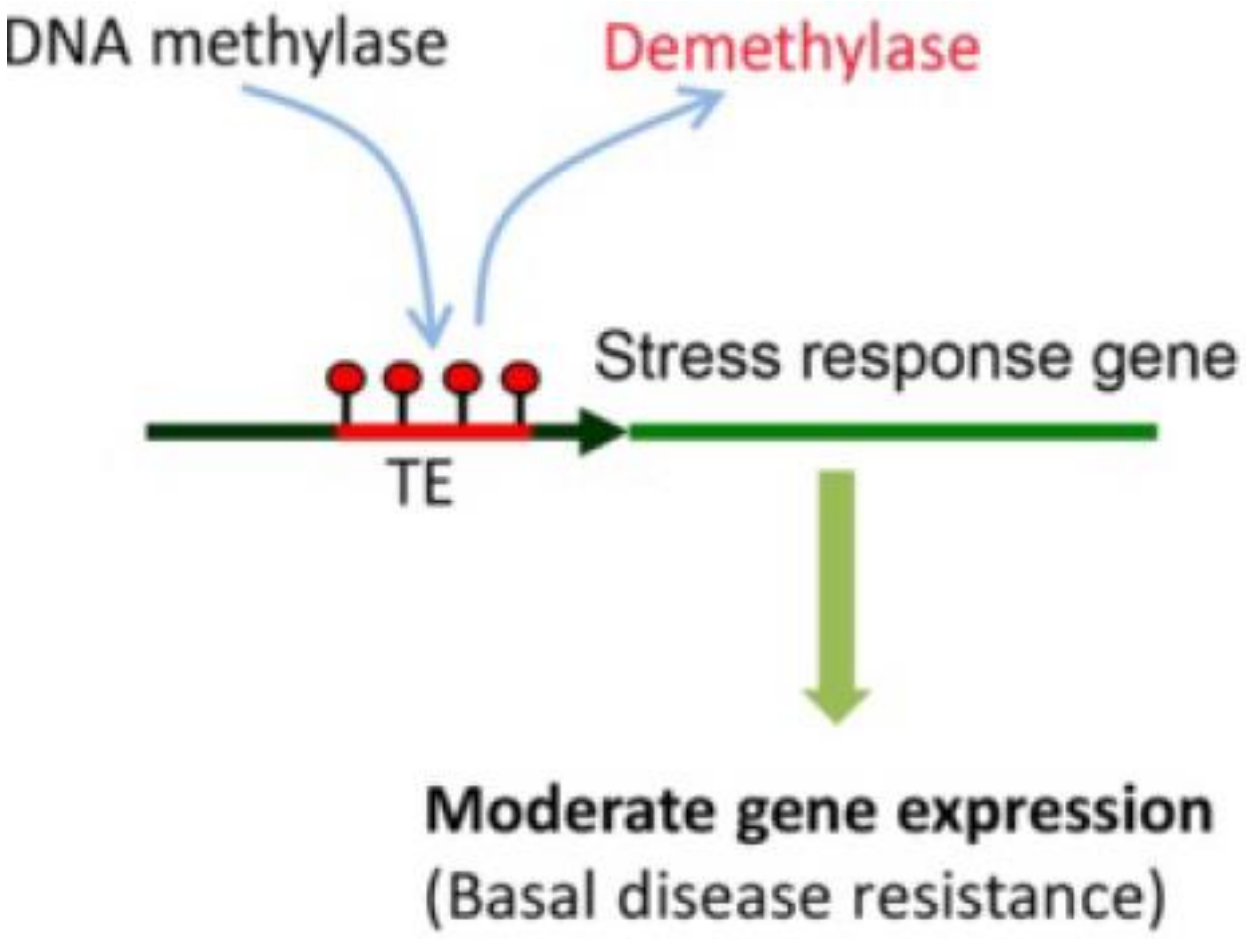
胞嘧啶　　甲基化胞嘧啶

胞嘧啶和甲基化胞嘧啶

DNA 甲基化修饰的功能

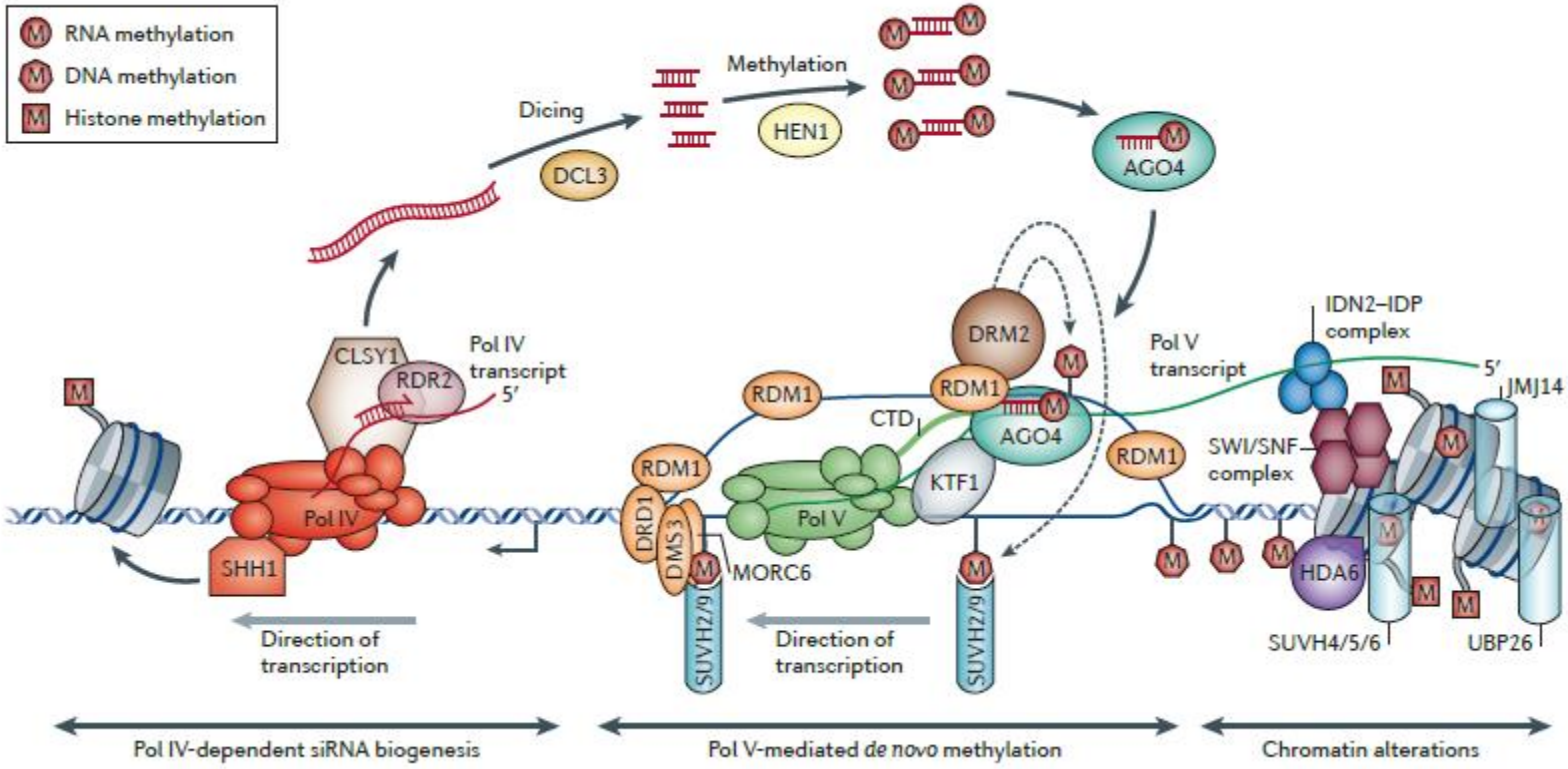


O'Malley RC, et. al: Cistrome and Epicistrome Features Shape the Regulatory DNA Landscape. **Cell 2016**, 165(5):1280-1292.



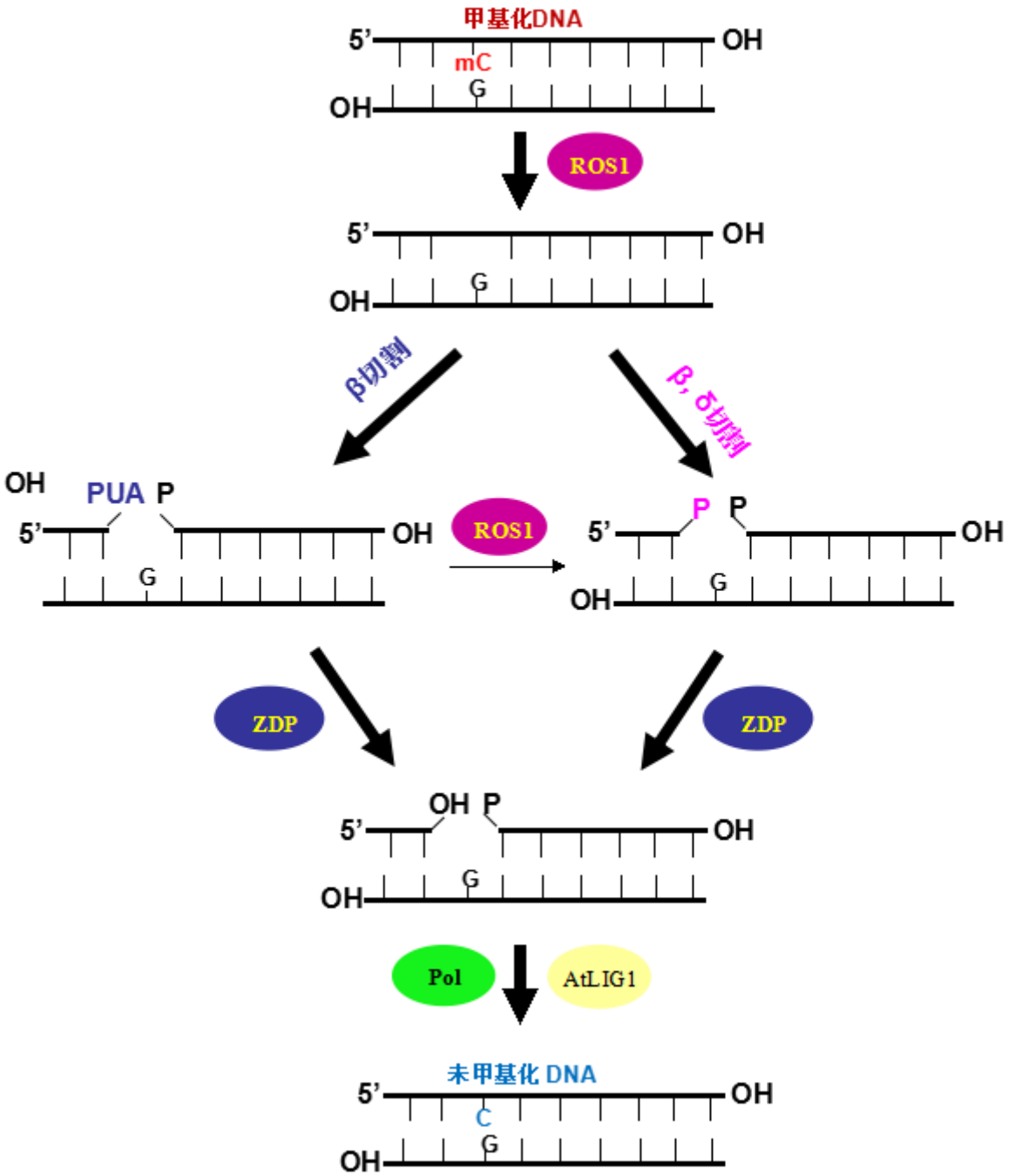
Le TN, et al: DNA demethylases target promoter transposable elements to positively regulate stress responsive genes in Arabidopsis. **Genome biology 2014**, 15(9):458.

DNA 甲基化修饰是如何建立的？

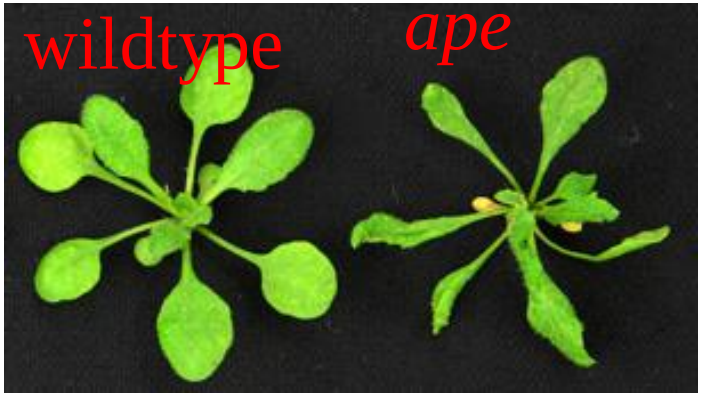


Matzke MA, Mosher RA: RNA-directed DNA methylation: an epigenetic pathway of increasing complexity. **Nature reviews Genetics 2014**, 15(6):394-408.

DNA 甲基化修饰是如何去除的？

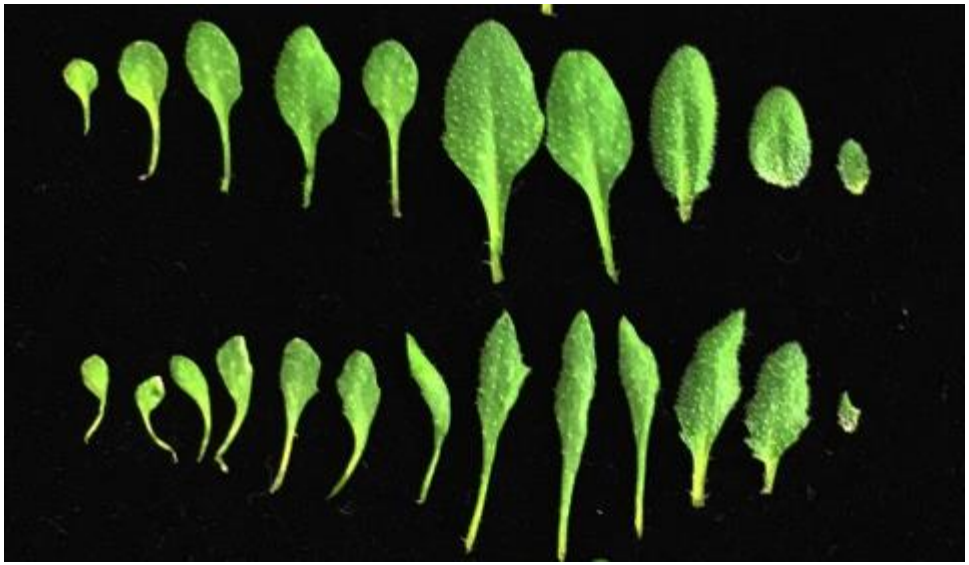

甲基化DNA
5’
OH
mC
G
OH
ROS1
5’
OH
G
OH
β切割
β, δ切割
OH
PUA
P
5’
OH
G
ROS1
P
P
5’
OH
G
OH
ZDP
ZDP
OH
P
5’
OH
G
OH
Pol
AtLIG1
未甲基化 DNA
5’
OH
C
G
OH

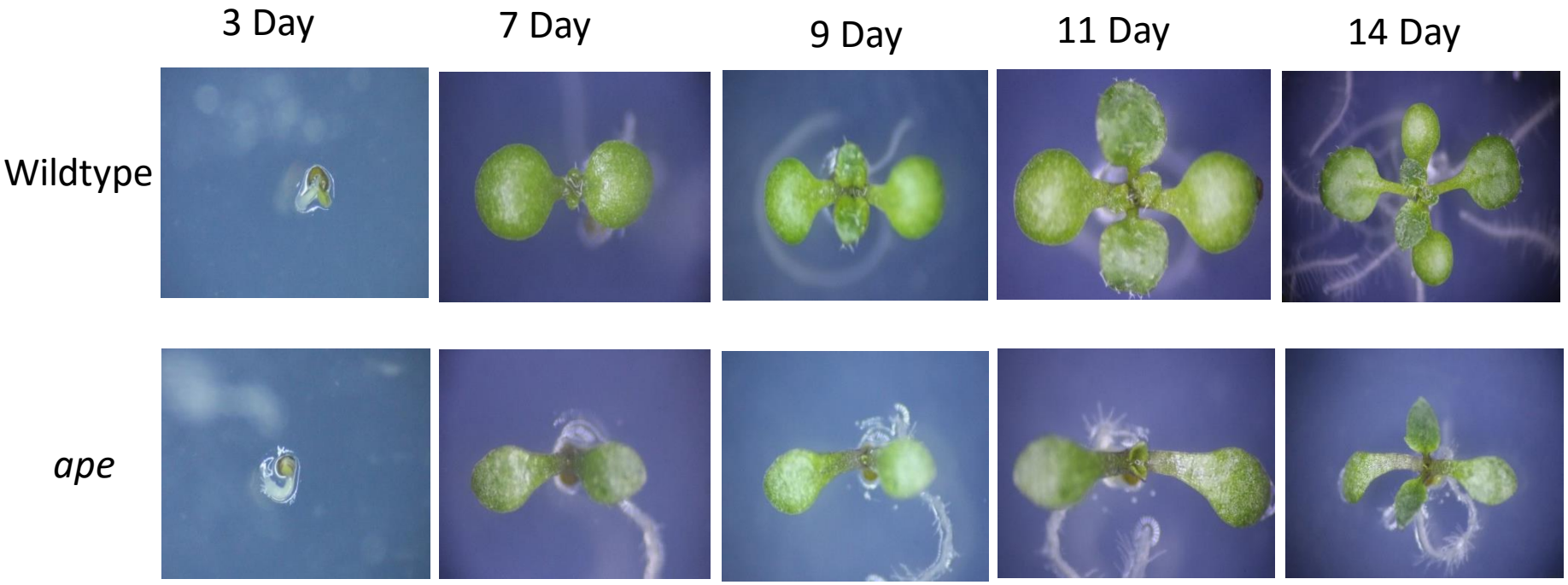
实验1：*APE*突变植株发育表型分析



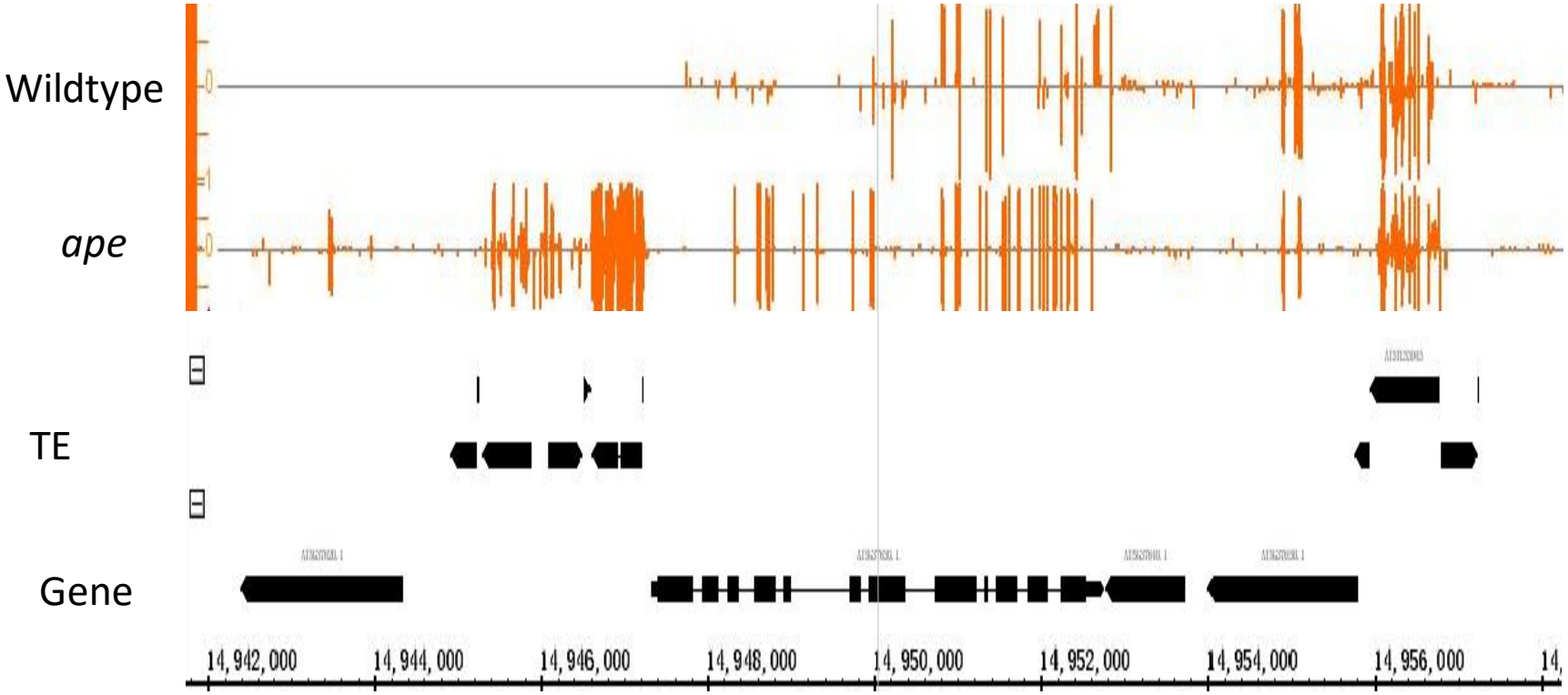
wildtype

ape

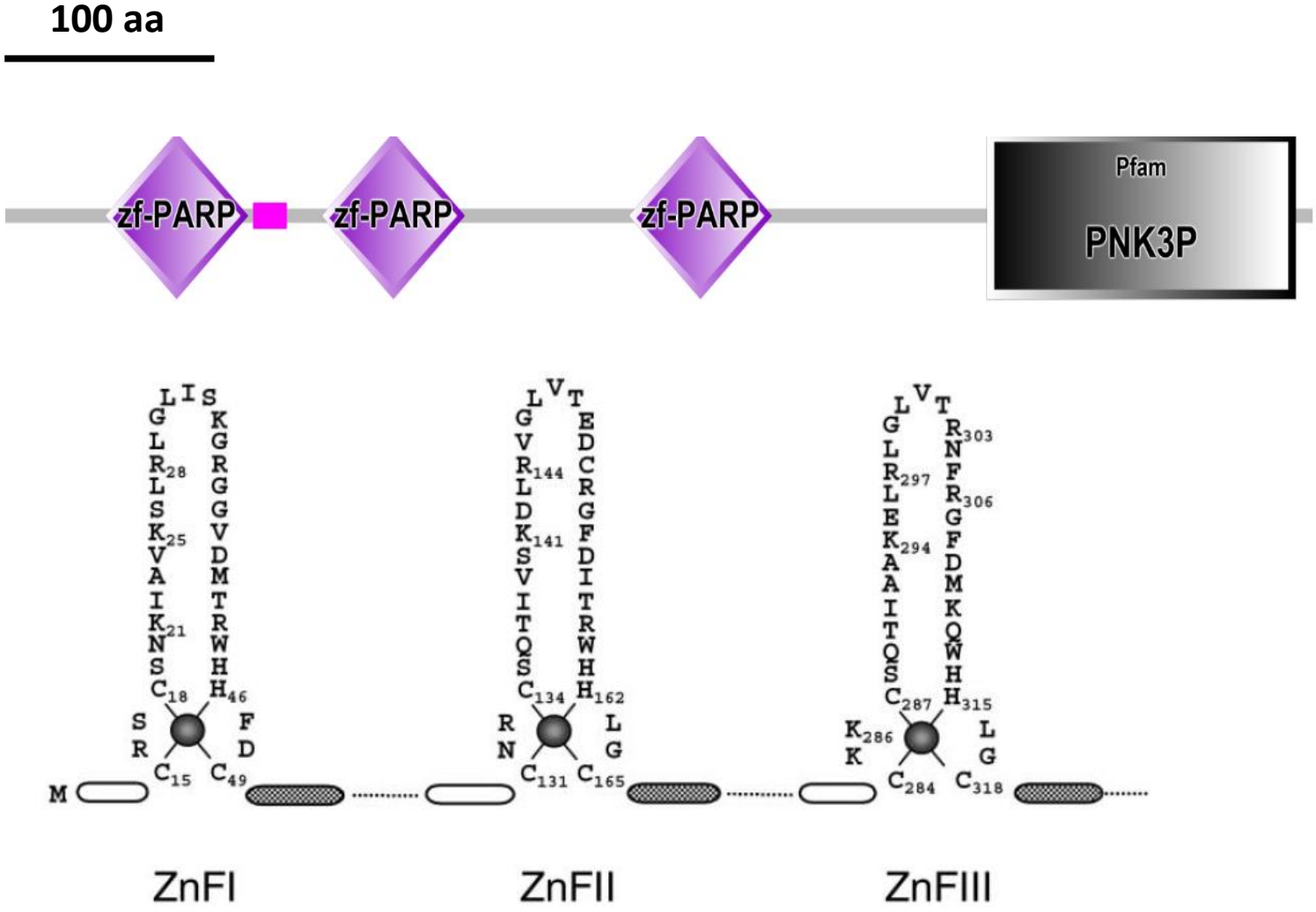



3 Day
7 Day
9 Day
11 Day
14 Day
Wildtype
ape

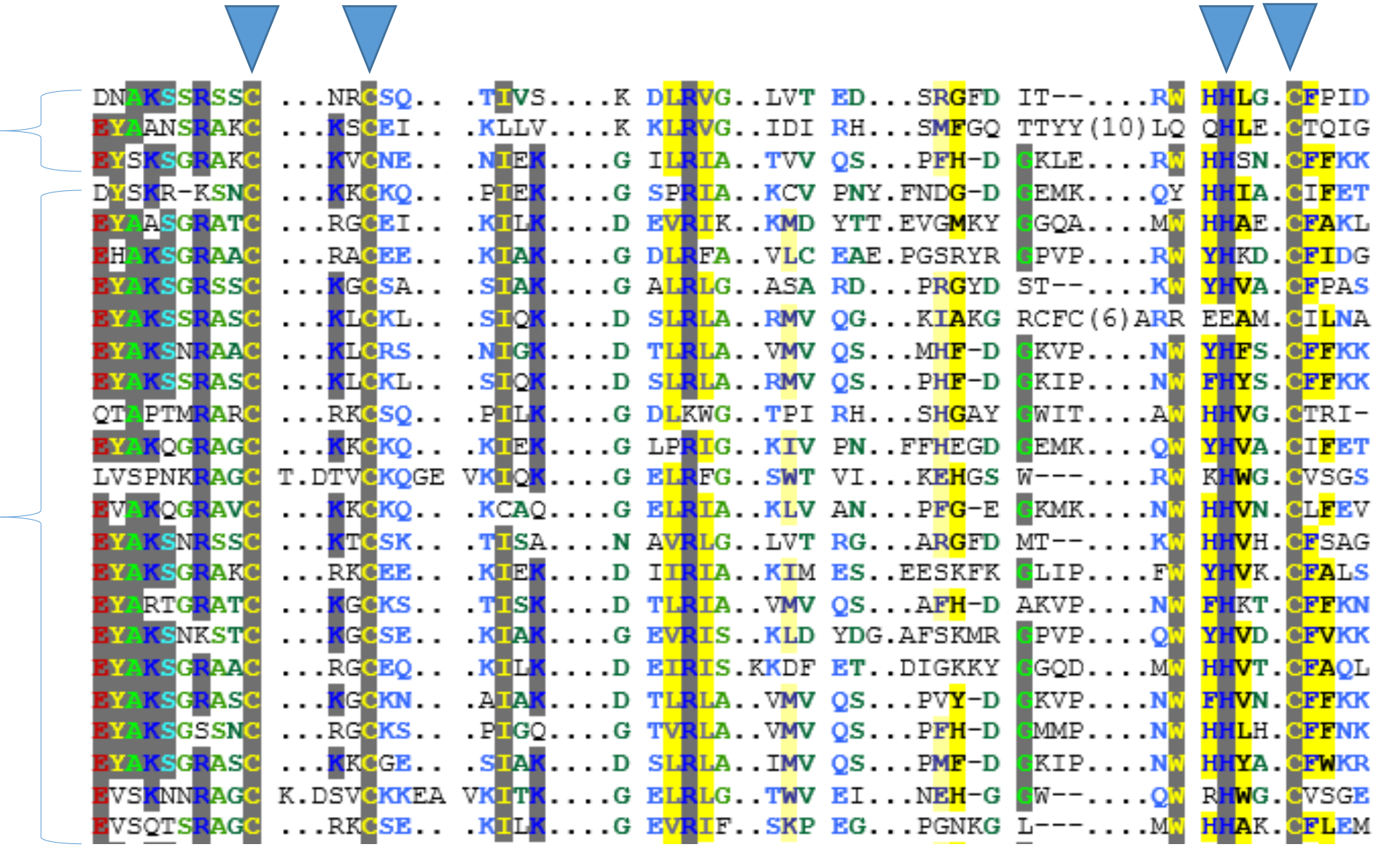
实验2：*APE*突变植株DNA甲基化分析



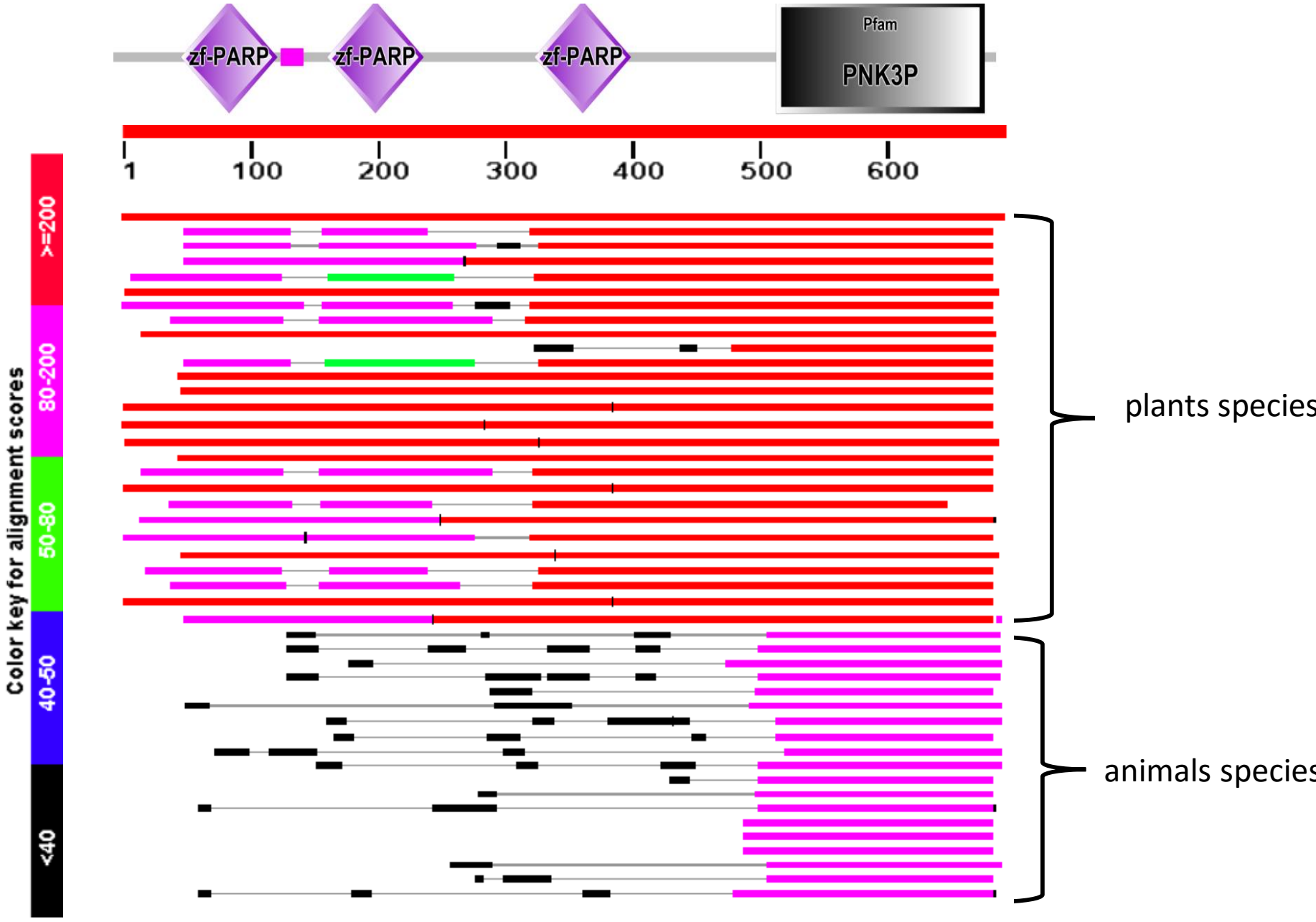
实验3：*APE*基因的结构分析



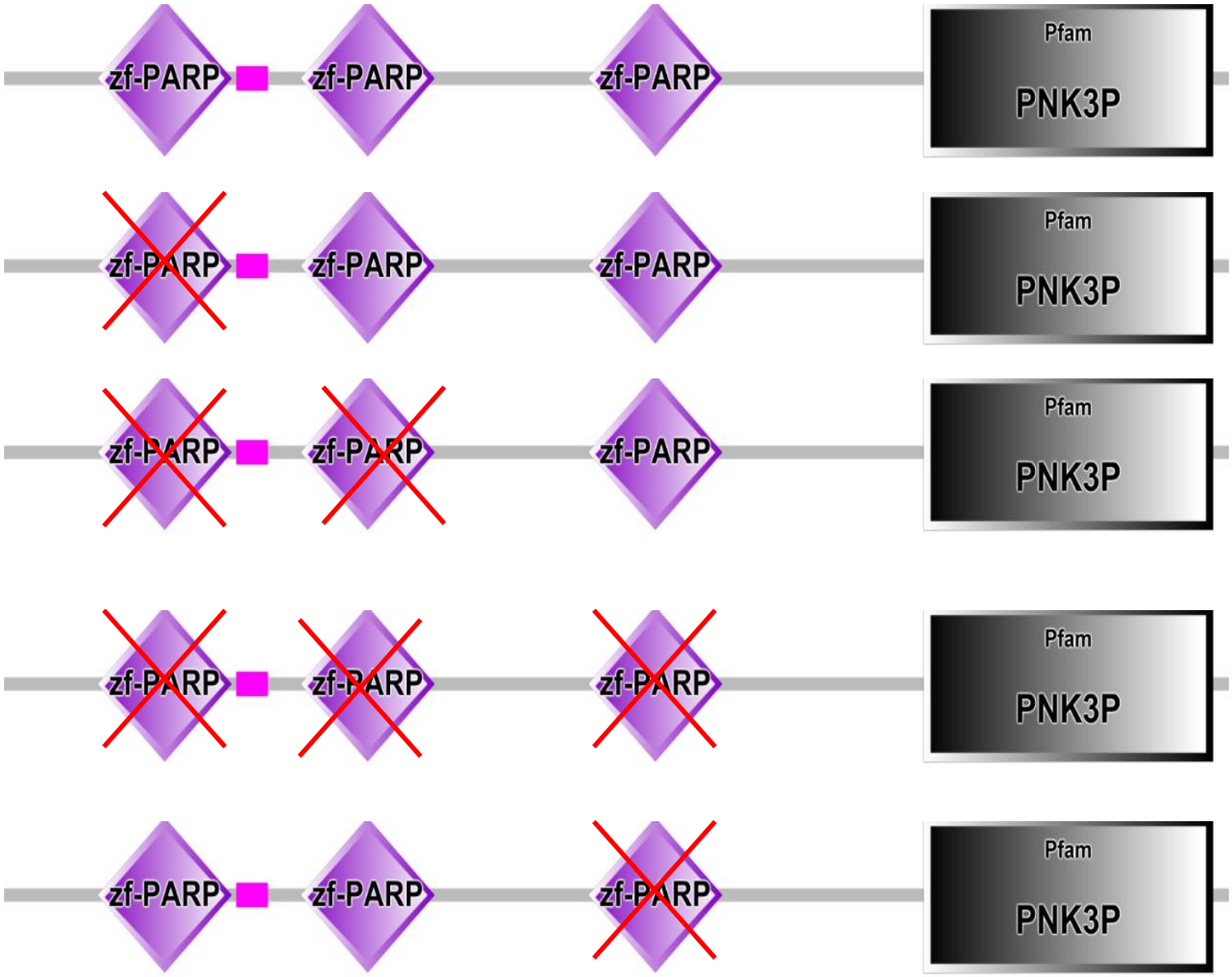
Petrucco S, Volpi G, Bolchi A, Rivetti C, Ottonello S: **A nick-sensing DNA 3'-repair enzyme from Arabidopsis**. *The Journal of biological chemistry* 2002, **277**(26):23675-23683.



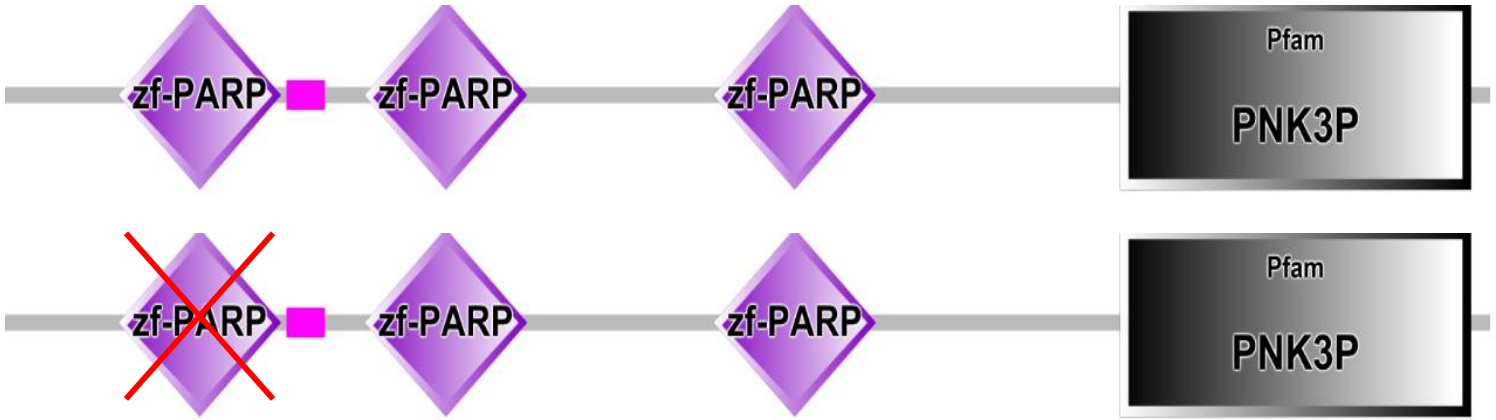
实验4：*APE*基因的演化分析



sp*1300*::*APE*::*GFP*/*ape*



sp*1300*::*APE*::*GFP*/*ape*



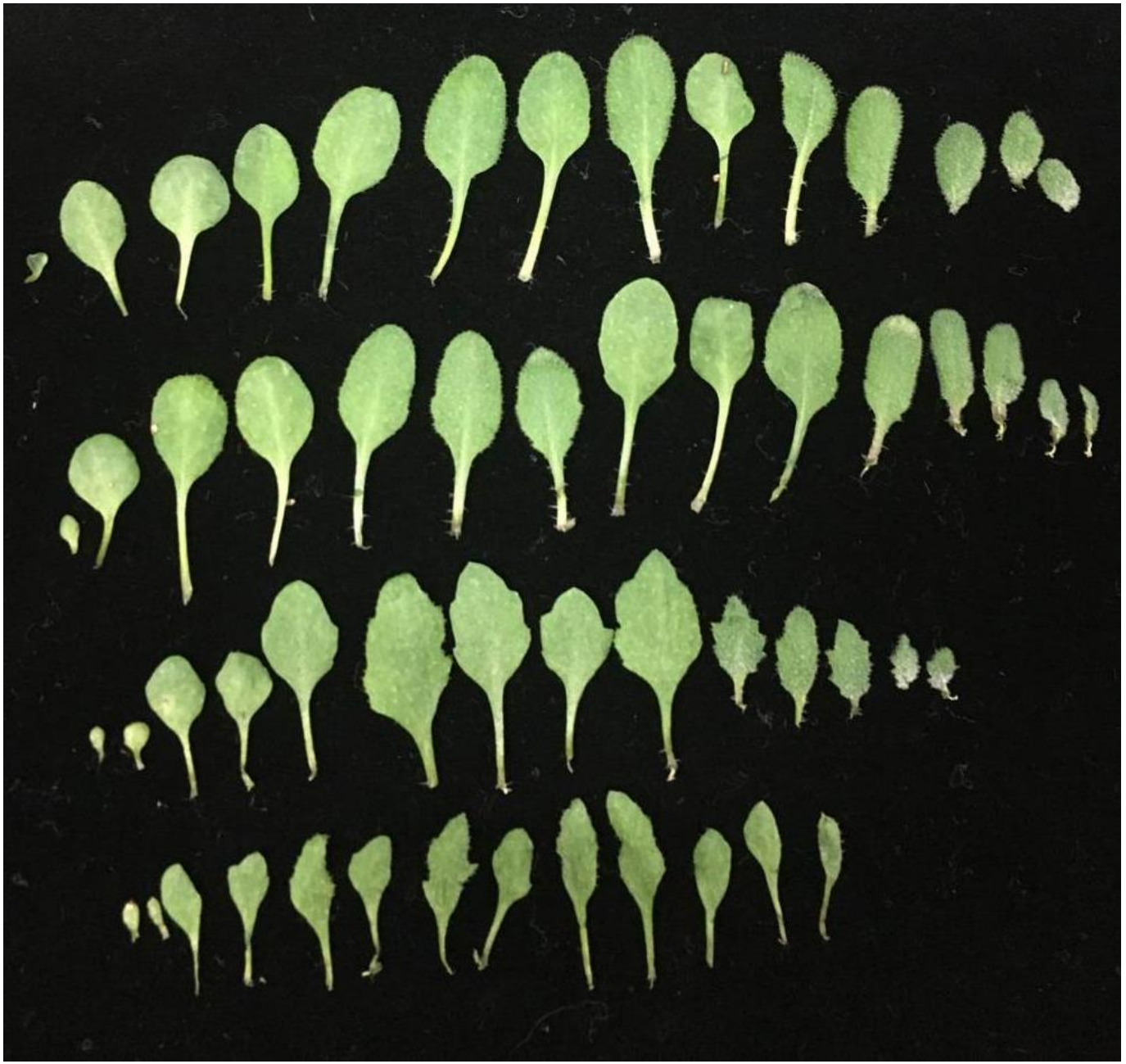
Col-0	*ape*
sp*1300*::*APE*::*GFP* /*ape*	sp*1300*::*APE* (*1st ZFm*)::*GFP* /*ape*

Wildtype

sp*1300*::*APE*::*GFP*
/ape

sp*1300*::*APE*
(1st ZFm)::*GFP*
/ape

ape



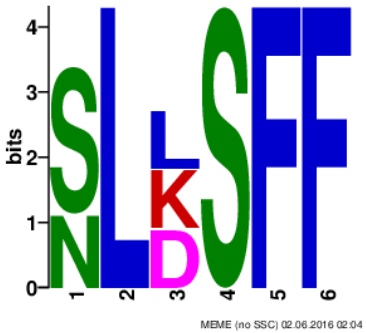
zf-PARP
zf-PARP
zf-PARP
Pfam
PNK3P

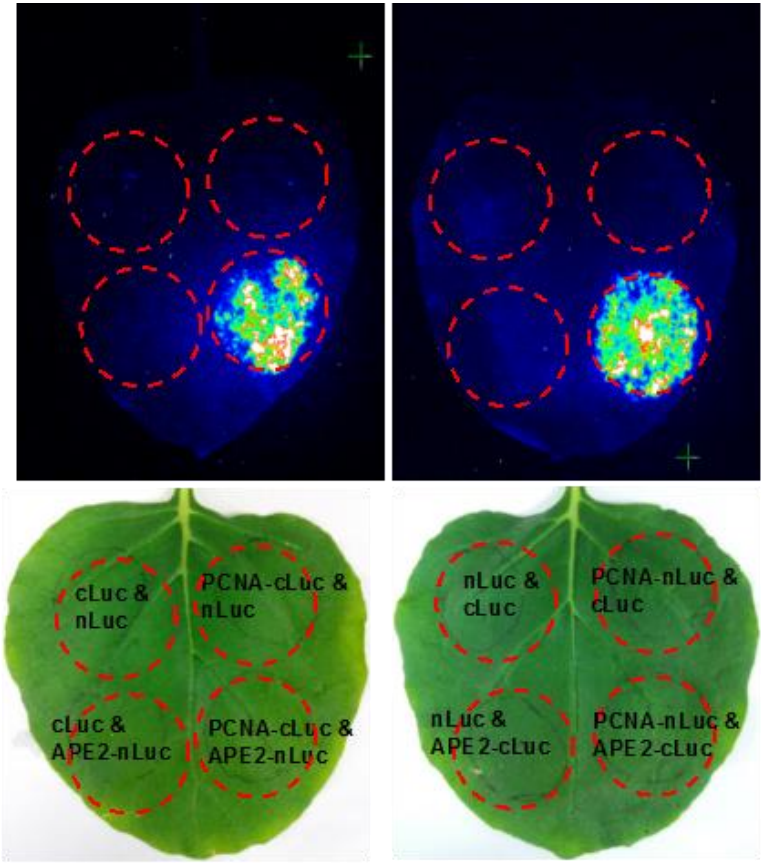
bits
0
1
2
3
4
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
MEME (no SSC) 01.06.2016 12:52

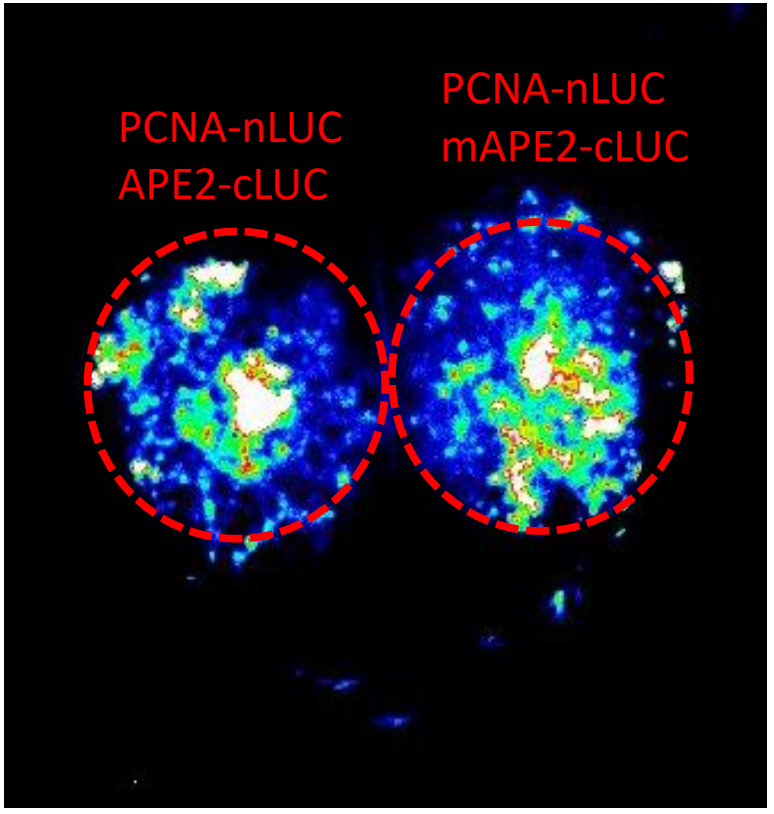
D265H

实验5：APE与PCNA的相互作用

人APE	NKSLDSFF
酵母APE	QGNLLSFF
拟南芥APE	QLSLKSFF
	: .* ***







致谢

感谢我们小组所有成员，这学期的共同学习我们结下了深厚的友谊！

感谢罗老师的教导！