



生物育种专业·基因编辑技术课程

第六章：哪吒八臂—CRISPR衍生技术

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西北农林科技大学





CRISPR之凤凰涅槃

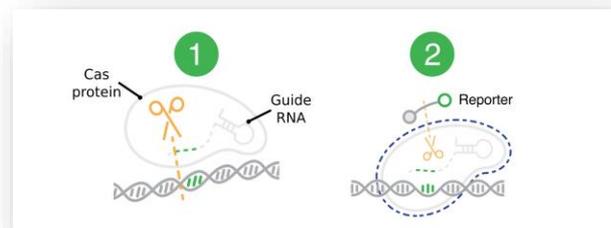
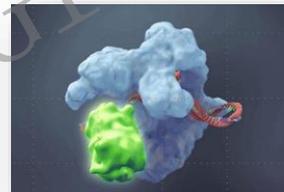
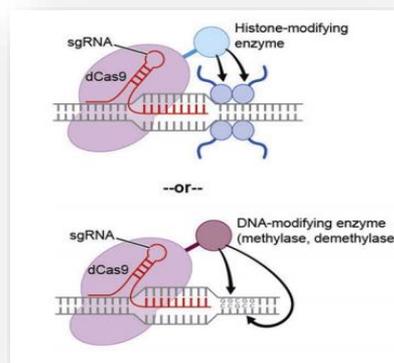
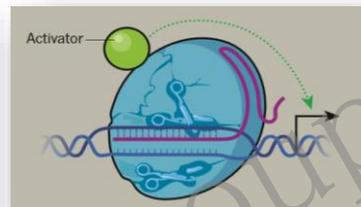
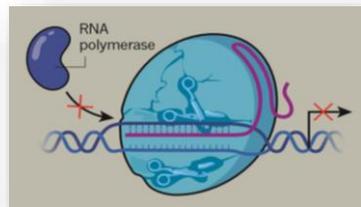
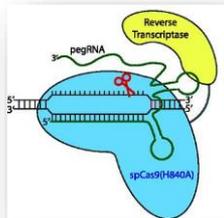
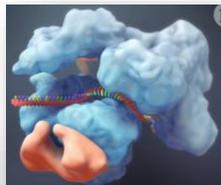
凤凰涅槃—dCas9

Cas9死了？不，

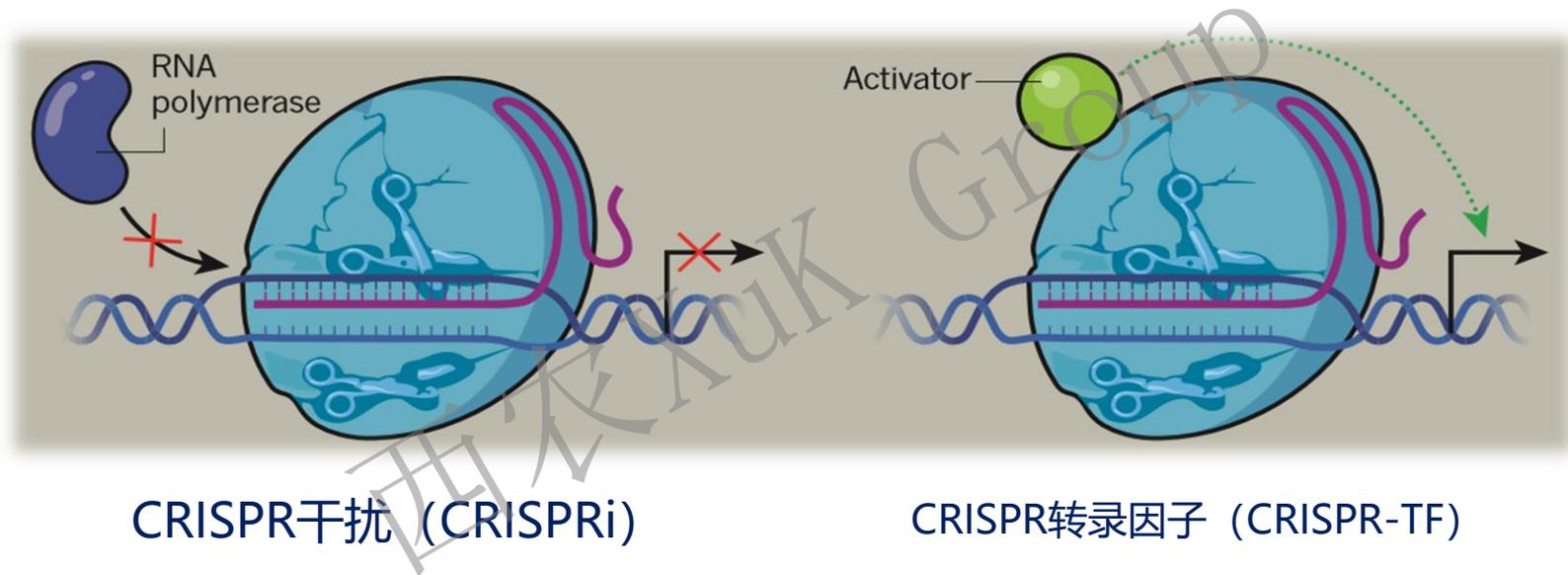
他还活着！

并且很精彩！

“八臂哪吒” -- 基于CRISPR/Cas系统的衍生技术

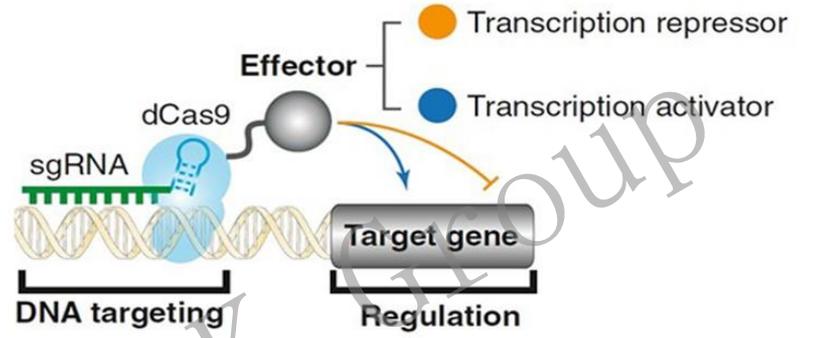


CRISPR衍生技术1.0--dCas9凤凰涅槃之DNA干扰

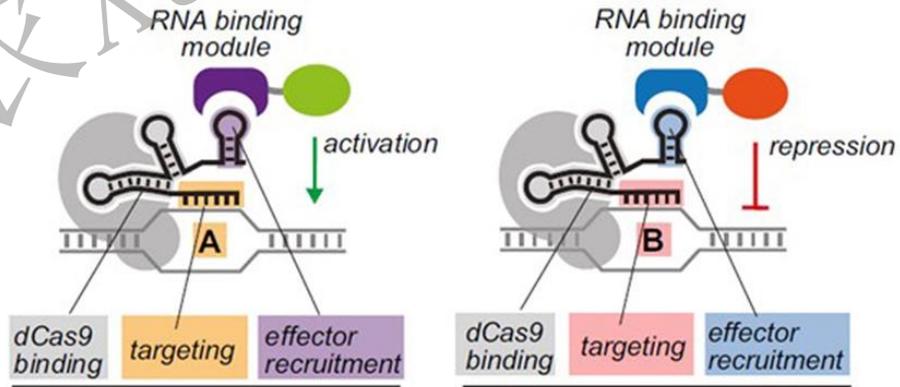


CRISPR衍生技术1.1-- dCas9凤凰涅槃之CRISPR转录因子

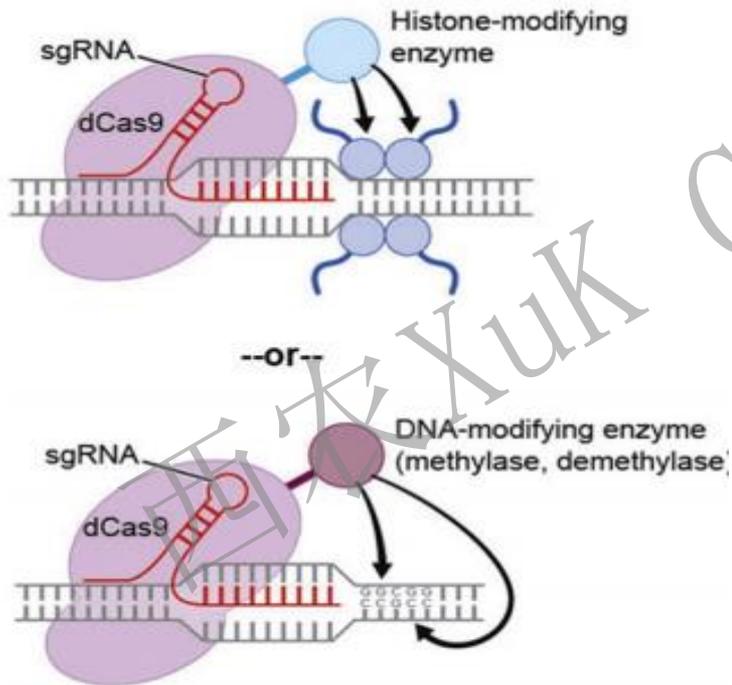
(1) dCas9 fusion



(2) sgRNA tether



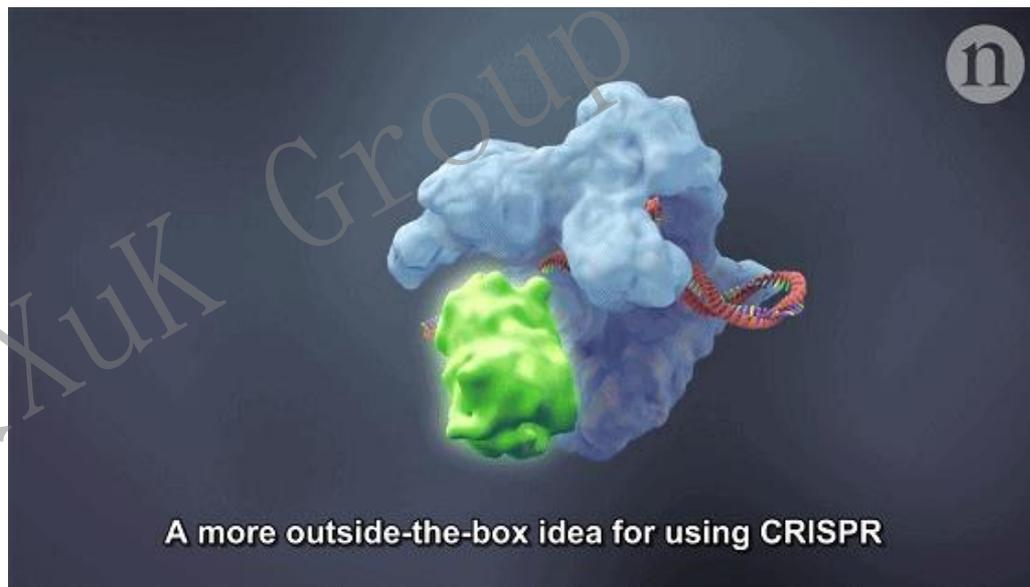
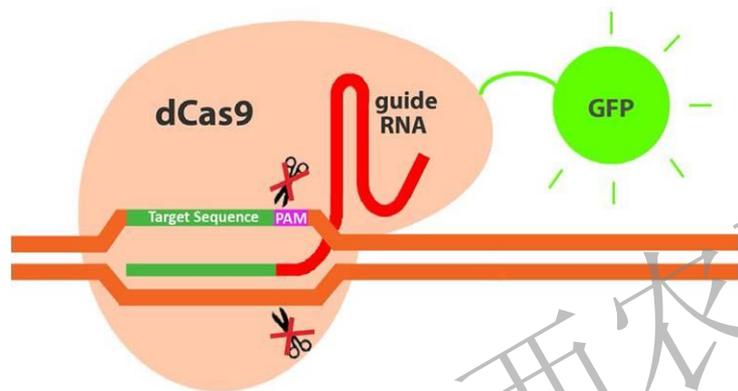
CRISPR衍生技术1.2-- dCas9凤凰涅槃之表观调控因子



m5C甲基化

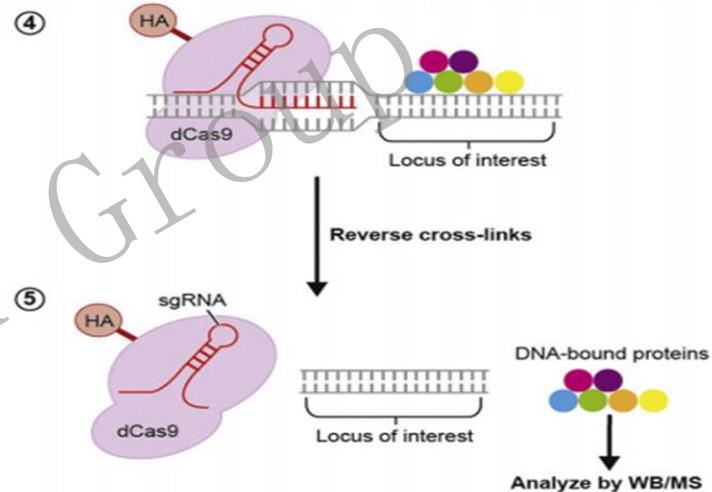
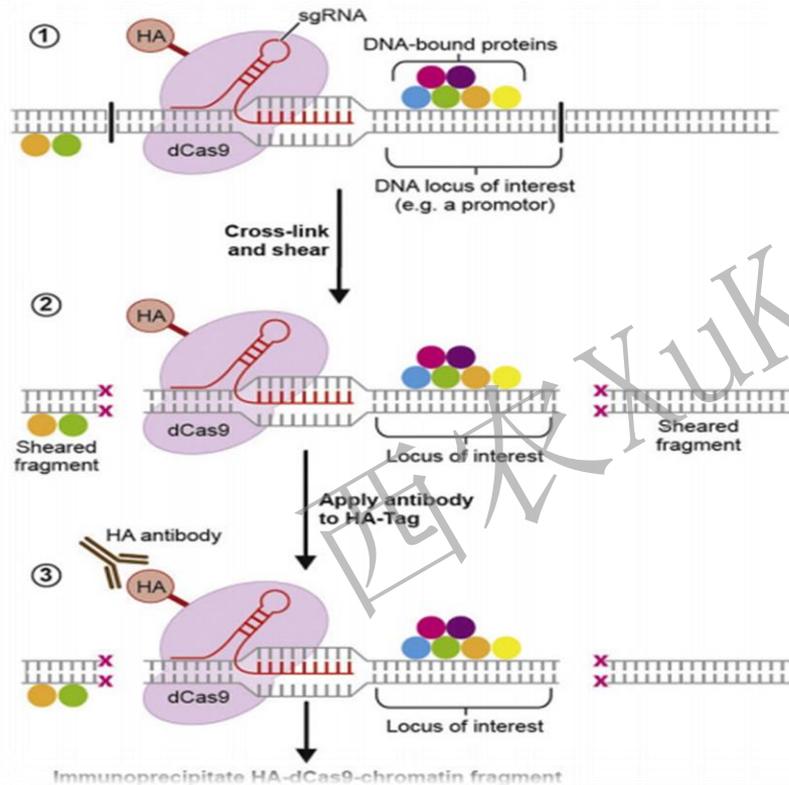
dCas9 fusion/sgRNA tether

CRISPR衍生技术1.3-- dCas9凤凰涅槃之CRISPR成像



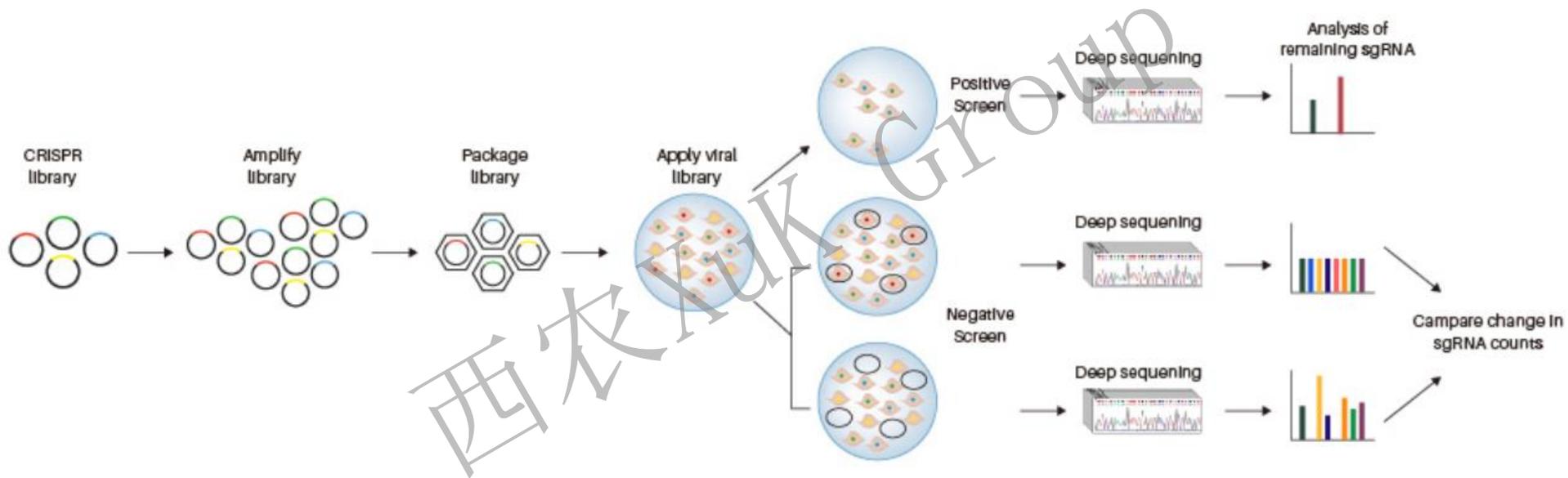
基因组动态成像、活细胞示踪

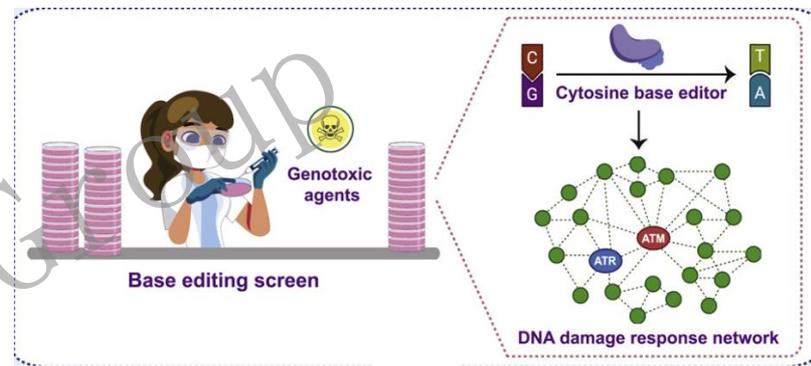
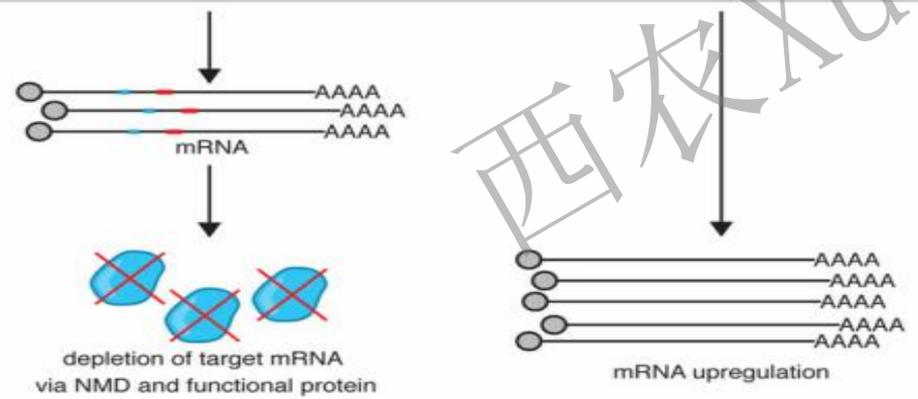
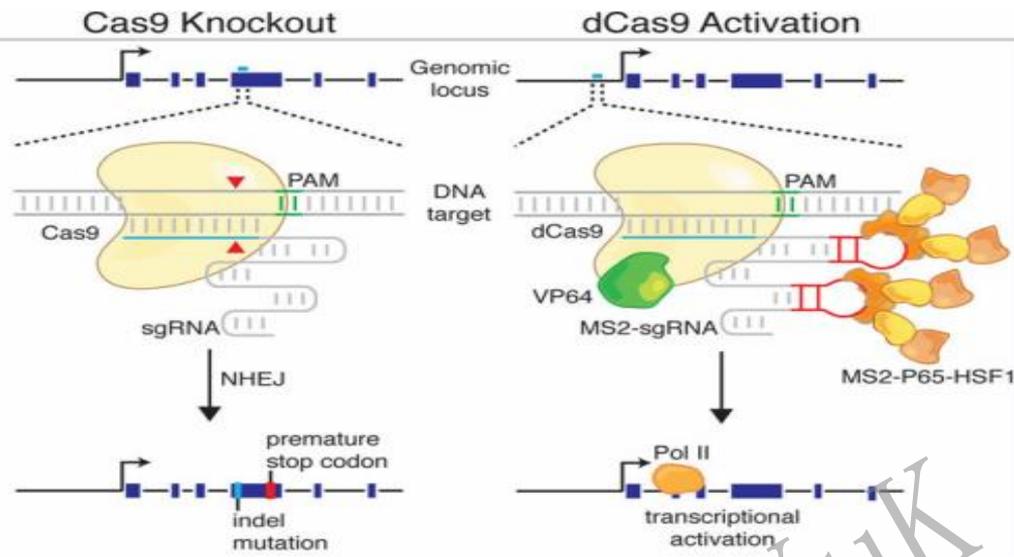
CRISPR衍生技术1.4-- dCas9凤凰涅槃之CRISPR-ChIP



- Can allow precipitation of a single chromatin fragment
- Unbiased examination of (theoretically) all proteins bound to one locus of interest

CRISPR衍生技术2.0--大数据玩法之CRISPR筛选



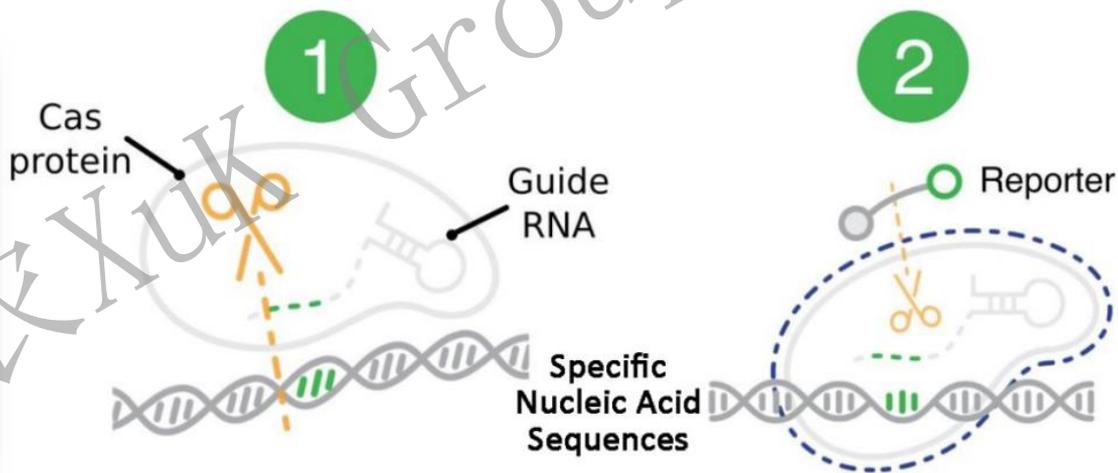
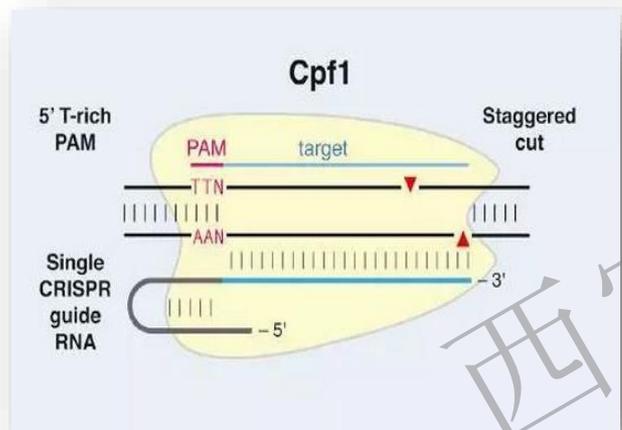


(Functional interrogation of DNA damage response variants with base editing screens. Cell, 2021.)

CRISPR衍生技术2.1-2.2-2.3

CRISPR衍生技术3.0--心有旁骛之CRISPR检测

DNA Endonuclease Targeted CRISPR Trans Reporter (DETECTR)



CRISPR/Cas12 非特异性旁切效应

CRISPR衍生技术4.0--超新星之RNA编辑

CRISPR/Cas13

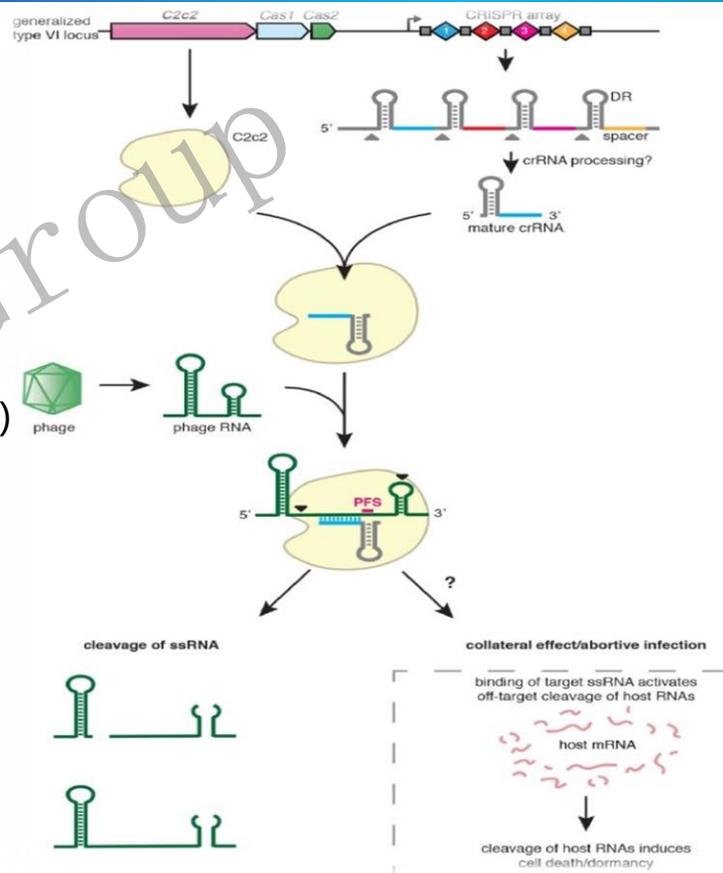
→RNA 清除: 类似RNAi

→CRISPR RNA检测: 类比 Tagman RT-qPCR(eg.新冠病毒检测)

→RNA editing/modifying: 类似CRISPR-EF (eg. m6A)? ?

→RNA imaging

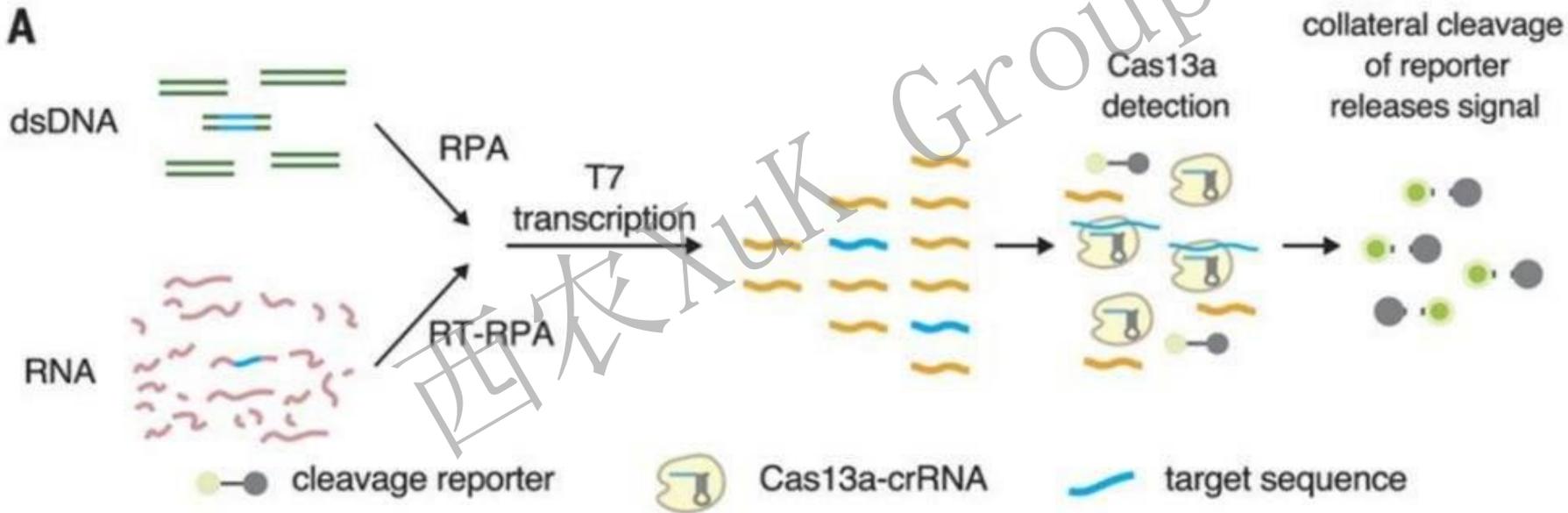
→RNA CHIP, 类似RIP



SHERLOCK--CRISPR/Cas13检测

Specific High-sensitivity Enzymatic Reporter Unlocking (SHERLOCK)

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