Why does CRISPR randomly fail 15% of the time?

The CRISPR gene editing process is known to fail about 15 percent of the time. These random failures have until now been a mystery to scientists who consistently work with the technique. When the technique is working properly, an enzyme called Cas9 is what actively makes the cuts to a desired position in a DNA strand. After the cut is made either a new desired sequence is added or an unwanted section is simply removed, with the two cut points gluing themselves back together.

The new research revealed that when the CRISPR process fails it is because the Cas9 enzyme effectively sticks to the DNA cut point, blocking the subsequent DNA repair process.

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The study also found that when RNA polymerases collide with Cas9 they can force the enzyme to dislodge. This means that consistent strand selection can significantly improve the genome editing technique's efficiency.

"I was shocked that simply choosing one DNA strand over the other had such a powerful effect on genome editing," says Ryan Clarke, lead author of the study. "Uncovering the mechanism behind this phenomenon helps us better understand how Cas9 interactions with the genome can cause some editing attempts to fail and that, when designing a genome editing experiment, we can use that understanding to our benefit."

Read full, original post: Researchers discover why the CRISPR gene editing system sometimes fails