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CRISPR-Cas9 in the Undergraduate Lab: A Short Implementation

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The popularity of CRISPR-Cas, amplified by news reports and social media centered on the potential of gene editing for human health, has gotten students interested in this "phenomenon". Instructors can use this opportunity to introduce CRISPR-Cas in the undergraduate laboratory. CRISR-Cas lends itself to be adapted to Classroom Undergraduate Research Experiences (CUREs). Often, these are semester or year-long courses, where students are guided through much of the whole process. We sought to determine if even a shorter implementation in a 5-week Molecular Biology summer course would provide students with a good understanding of the technology, its methods and applications, while allowing them to fail and improve. The course was developed shortly after attending the CRISPR-Cas pre-ABLE 2018 workshop. All students in the class designed sgRNAs for the same *Danio rerio* gene. Each group of 2 was then assigned the synthesis and *in vitro* validation of one guide. Remarkably, all students were able to successfully create functional guides. Students wrote a lab report to summarize their work and filled a survey to gauge their gains. This experience demonstrates that even with a limited scientific scope and a small budget ($700), it is possible to have a successful implementation of CRISPR-Cas.

Keywords: CRISPR-Cas9, CURE

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