St. Jude Children's Research Hospital

St. Jude BioHackathon

Title
Web app for designing CRISPR gRNAs that utilizes all available orthologues and interactively shows off-target effects of a desired edit

Category
GUI Tool Development

Challenge
CRISPR Cas9 is a powerful genome editing tool that allows precise modifications in complex genomes. New Cas orthologues, varients, and platforms are constantly being added to the CRISPR toolbox. There are tools available to help scientist design gRNAs (the targeting component of CRISPR) for some Cas9 platforms (https://chopchop.cbu.uib.no/), but there isn't a platform that includes all available orthologues and platforms. In particular, I would like a tool in which you can enter a sequence of DNA and a percise edit to be made and the tool displays all Cas9 options (including Base-editing).

Ideally, this tool would also include an in silico off-target analysis based on homology to other sites in the genome.

Benefit
More efficient design of gRNAs for genome editing

Helpful Tools, Packages, or Software
I think adding based editing as an option to something like CHOPCHOP (https://chopchop.cbu.uib.no/) would be amazing. It would also be nice to be able to easily add additional editors as they come online.

See BreakingCas (https://bioinfogp.cnb.csic.es/tools/breakingcas/index.php) as well.

Test Data
Any DNA sequence or targeted edit.