

# WHY POLLY CRISPR SCREENING IS BETTER THAN MAGECK VISPR?

CASE STUDY

## OVERVIEW

CRISPR Cas9 is a powerful gene-editing tool that cuts the DNA in a precise manner. The most common use of CRISPR Screening is finding gene targets for various diseases. The process of a typical CRISPR Screening experiment is as follows :

## KEY FEATURES

- Processing on cloud
- Restore previous analysis
- Share analysis
- View multiple comparisons on the same dashboard



There are various tools developed for processing CRISPR Screening data. Some of them are MAGECK, HitSelect, ScreenBEAM, BAGEL, sgRSEA, PBNPA, MAGECK VISPR which use different algorithms.

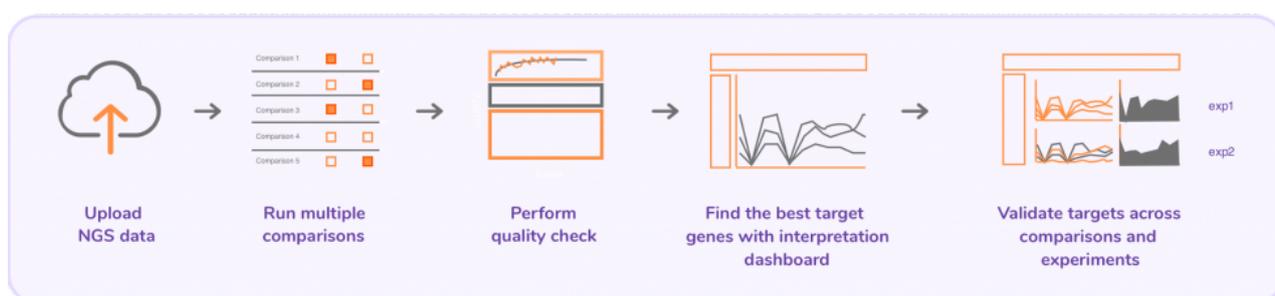
## CHALLENGES

All the tools mentioned are script based and which can be used by Bioinformaticians or tech-savvy Biologists. These are not user friendly and pose lots of challenges for anyone wanting to use. Let's try to understand the challenges using one of the most widely used tool, MAGECK VISPR.

- **Installation** : The tool has to be installed using a Terminal/Command prompt and needs some dependencies which can conflict with other tools installed. Moreover, it's not easy for a Biologist to figure out version clashes occurring in dependencies due to various tools.
- **Command line interface**: It's a command-based tool that requires the user to create a yaml file which contains the information regarding the analysis. Then a specific set of commands need to be run on Terminal/Command prompt in order to process CRISPR screening data which is not comfortable for most.
- **Limited processing power**: CRISPR screening datasets are huge, usually in GBs. Processing that data with the computational power of just a local computer can take hours. Due to the limitation of computational power, only one comparison can be processed at a time. The computer needs to stay on throughout the time.
- **No way to restore** : The analysis performed once cannot be restored back to view the result visualisations. The analysis has to be run again.

## SOLUTION

Polly CRISPR Screening, based on MAGeCK algorithm, is a cloud-based tool with an interactive interface instead of a command-line interface. This decreases the learning curve of the tool and makes it much easier to use. And, considering it is cloud-based, there's no need to install anything on the local computer and data can be processed from any computer.



The following are the benefits of Polly CRISPR Screening :

### **Fast processing**

Processing is up to 2x faster compared to a local computer. (Specifications for comparison: Intel Core i5 with 2.5GHz frequency, 4 GB RAM)

### **Multiple comparisons**

Polly CRISPR screening workflow lets you run multiple comparisons at the same time, processing all of them simultaneously

### **Restore analysis**

The output is stored on the cloud which can be restored later by logging into your Polly account

### **Share and collaborate**

You can share your project with peers and collaborate in studies with them over the platform

### **Multiple comparisons dashboard**

This dashboard provides information about how genes behave across different comparisons. This helps to identify whether a specific target is consistent across various analyses and experiments helping validate or reject a hypothesis much faster. The dashboard also has an option to generate a list of all the genes that are common across multiple experiments. It helps in identifying gene targets

### **sgRNA removal**

There are sgRNAs which have an abruptly high count in a sample. The sgRNA remove function helps to remove such gRNAs from the experiment and re-run the MAGeCK analysis on the dashboard

### **IPython notebook**

You can customize the workflow by writing custom scripts in the IPython notebook feature. This is particularly useful as every lab has its own workflow for experiments they conduct

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