PHOTOCLEAVABLE INTERFERING GUIDE RNAS

Tech ID: 34000 / UC Case 2025-117-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

CRISPR-based diagnostic tools can detect DNA or RNA with high sensitivity and specificity. In these systems, enzymes like Cas13a use a guide RNA to find a matching target sequence, which activates the enzyme to cut nearby RNA molecules. This cutting activity is used to generate a fluorescent signal, allowing detection of the target. However, the system can produce background signals even without a target, and it can be difficult to separate signals when testing for multiple targets at once. Improving the ability to distinguish true signals from background noise is a key challenge for making these diagnostics more reliable.

This invention comprises a novel method to achieve precise spatio-temporal activity of Cas13a activity using light. Briefly, a single photo-cleavable/photodegradable component that links a canonical cRNA to an interfering DNA segment that suppresses the trans-cleavage activity of Casi3a. Prior to light exposure, activity of Cas13 is inhibitied even in the presence of activating (target) RNA molecules. Upon brief light exposure the Cas13a activity rapidly recovers to the full rate for a given guide-target combination. Several levers exist within this system, specifically the length of interfering DNA segment and the intensity of light, which tune the degree of suppression and the level trans-cleavage activity before and after light exposure, respectively.

SUGGESTED USES

- Precise spatio-temporal control of Casl3a assay in droplets
- Co-infection models where two viruses can be detected in a single reaction with accurate estimates of the relative concentrations of both viral RNAs present.

ADVANTAGES

- Improved signal to background ratios in thedetection of positive droplets.
- Spatiotemporal control of multiple items in a single reaction.

RELATED MATERIALS

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

▶ Cas13a RNP with Split gRNA for miRNA Detection

CONTACT

Laleh Shayesteh
lalehs@berkeley.edu
tel: 510-642-4537.

INVENTORS

» Fletcher, Daniel A.

OTHER INFORMATION

CATEGORIZED AS

» **Medical**

» Diagnostics

RELATED CASES

2025-117-0

▶ Mobile Method For Ocular Imaging

University of California, Berkeley Office of Technology Licensing
2150 Shattuck Avenue, Suite 510, Berkeley,CA 94704
Tel: 510.643.7201 | Fax: 510.642.4566
https://ipira.berkeley.edu/ | otl-feedback@lists.berkeley.edu