Skysong Innovations
Advancing the Arizona State University Knowledge Enterprise

1475 N. Scottsdale Road, Suite 200
Scottsdale, AZ 85287-3538
Phone: 480 884 1996 Fax: 480 884 1984

Case ID:M23-026L
Published: 6/14/2023

## Inventors

**Alexander Green**
**Soma Chaudhary**
**Kirstie Swingle**

## Contact

Jovan Heusser
jovan.heusser@skysonginnovations.com

# CRISPR-Cas/Transcription Factor-Based Assay for Detection of Molecular Analytes

The ability to detect small molecules and other chemical analytes is important for many applications from assessing drinking water to monitoring effluents and ensuring food and drinks are safe to consume. While synthetic biology has enabled the development of molecular biosensors, such as transcription factors, to detect small molecules, they rely on expensive laboratory instruments, are not very robust and have relatively high detection limits.

Researchers at the Biodesign Institute of Arizona State University have developed a novel sensitive, specific, and fast assay to detect a variety of different small molecules, such as antibiotics and sugars. This method combines transcription factors with CRISPR-Cas DNA recognition to enable detection of a variety of different analytes. This approach is compatible with a variety of different transcription factors and can be performed with little equipment. Further, this assay has interchangeable readout mechanisms, i.e. fluorescent, simple visible/lateral flow strip, paper-based platforms, etc.

This assay is valuable for applications with a need for portable biosensing capabilities with a huge range of potential analytes to detect.

Potential Applications

- Small molecule and chemical analyte detection
  - Assessing drinking water purity
  - Monitoring effluents from treatment plants
  - Ensuring food and drinks are safe to consume
  - Identify environmental contaminants
- Antibiotic detection
  - Help understand and prevent further problems related to antibiotic resistance

Benefits and Advantages

- Compatible with multiple different output formats – e.g. fluorescent, lateral flow, paper-based
- Sensitive, specific and rapid
- Can be implemented in multiplexed reactions
- Can be applied to different samples including tap water and wastewater
- Portable/field deployable biosensing
- Simple amplification step
- Easy to use
- Demonstrated LOD varying from 80 nM to 900 pM
  - Specific LOD of 0.2 μM for doxycycline

For more information about this opportunity, please see

Chaudhary – Dissertation - 2022

For more information about the inventor(s) and their research, please see

Dr. Green's departmental webpage