

# **Bioluminescent assay for rapid and sensitive screening of bacterial beta-lactamase activity**

Researchers at Stanford University have developed a rapid and sensitive bioluminescent assay for screening bacterial infections using enzyme-produced photo emission for detection of beta lactamase activity.  $\beta$ -lactam antibiotics are the most successful class of antibiotics, however there is growing resistance due to in part by inappropriate antibiotic treatment regimens that encompass a broad spectrum of antibiotics. Bacteria containing  $\beta$  -lactamase enzymes such as extended-spectrum  $\beta$  -lactamases (ESBLs), AmpC-type  $\beta$  -lactamases (ACBLs) and carbapenemases (CARBs) hydrolyze  $\beta$  -lactam antibiotics rendering them ineffective. Rapid and accurate detection of  $\beta$  -lactamase activity would allow for targeted treatment of bacterial infection. Current detection methods take 2-3 days to generate results in clinical laboratories and genotypic testing while rapid, tend to generate false-positive results. These limitations are addressed in a reliable and fast bioluminescent  $\beta$ -lactamase detection assay invented by researchers at Stanford University. They have improved upon their first-generation bioluminescent probe (BLUCO) for detecting  $\beta$ -lactamase activity in Gram-negative bacteria. Their bioluminescence detection assay uses enzyme-produced photon emission which confers the advantage of low background and a rapid assay time of 15 minutes. This technology could be implemented into an in vitro diagnostic test for rapid assaying of  $\beta$  -lactamase activity in patient samples for guided treatment of infectious diseases.

## **Applications**

- In vitro diagnostic agent for assaying beta-lactamase activity in patient samples to guide antibiotic treatment

## Advantages

- 15-minute  $\beta$  -lactamase detection assay
- Sensitive, low background detection of  $\beta$  -lactamase activity

## Patents

- Published Application: [WO2022245975](#)
- Published Application: [20240229098](#)

## Innovators

- Jianghong Rao
- Tingting Dai
- Jinghang Xie
- Ran Mu

## Licensing Contact

### Hyunjin Kim

Licensing Manager, Life Sciences

[Email](#)