

Discovery of a new method for detecting queuosine, a new target for preventing bacterial infections and biofilms

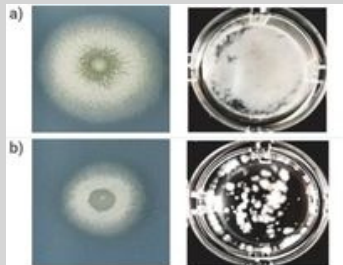


Figure 1. Q+ (a) and Q- (b) bacteria culture (*).

MARKET NEED 

El The queuosine measurement kit addresses the need to:

- Combat **antibiotic resistance**
- Design new methods for **diagnosing bacterial diseases**
- Develop new **antibacterial treatments**

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STAGE OF DEVELOPEMENT

- Technology protected by a **patent application**
- **TRL 4**. The development of the kit should take no more than a few months.
- **Collaboration** is sought for the commercial exploitation of the invention and subsequent **technology transfer**

REPORTER GENE CONSTRUCT SENSITIVE TO QUEUOSINE LEVELSIT

Researchers from the Department of Molecular Evolution at the Center of Astrobiology (CAB), INTA-CSIC, have developed a method for measuring queuosine levels.

The method proposed is suitable for the quantification of queuosine levels. This is a nucleoside present in bacterial and eukaryotic transfer RNA, which is **linked to biofilm formation, virulence, and complex human diseases**. The method involves the creation of an artificial genetic construct containing a gene for a fluorescent protein and a regulatory region that controls its expression depending on the levels of queuosine or its precursors in a sample.

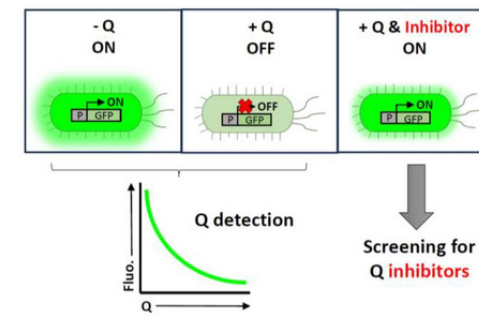


Figure 2. Schematic diagram of the technology operation.

(*). Nucleic Acids Research, Volume 51, Issue 18, 13 October 2023, Pages 9821–9837 <https://doi.org/10.1093/nar/gkad667>.

Apart from bacterial infections, queuosine has been associated to various pathologies related to microbial dysbiosis, such as chronic intestinal diseases. Moreover, multiple studies have addressed its potential role as an antitumoural molecule. In addition to its therapeutic application, the discovery of this mechanism provides a better understanding of the process of bacterial community formation, virulence control, and adaptation to extreme conditions.

ADVANTAGES 

- It allows the measurement of queuosine or its precursors in a **straightforward, cost-effective, and secure** manner.
- It may serve as a **simple and scalable detection tool** for antimicrobial surveillance.
- It provides high sensitivity, operating at **very low concentrations** (in the nanomolar range), which is crucial for early detection.
- It could be used to prevent and combat problems related to biofilms and infections caused by a **wide range of bacterial species**.