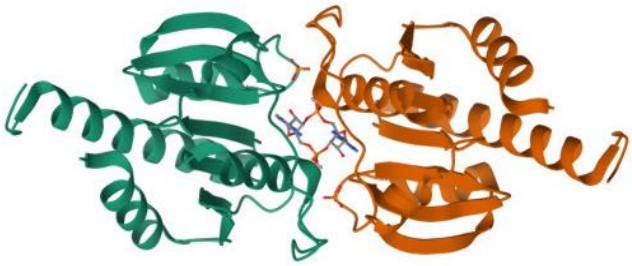
Cyclic-di-AMP Detection Platform

A Highly Specific and Sensitive Method for Quantifying Bacterial Second Messenger Signaling in Biological Samples

Background:

Cyclic-di-AMP (c-di-AMP) is a critical bacterial second messenger involved in diverse cellular processes, including cell wall homeostasis, stress response, and virulence regulation. Its essential role in bacterial physiology makes it an attractive target for antimicrobial research and a potential biomarker for bacterial infections. However, accurately detecting and quantifying c-di-AMP in biological samples has been a longstanding challenge due to its structural similarity to other nucleotide-based signaling molecules, such as cyclic-di-GMP and cAMP. Conventional detection methods, such as mass spectrometry and traditional biochemical assays, often suffer from limited specificity, cross-reactivity, or low sensitivity, making it difficult to study the precise regulatory mechanisms of c-di-AMP in bacterial systems. The lack of reliable detection tools hampers research efforts in microbiology, diagnostics, and drug development, highlighting the need for a highly specific and sensitive approach for c-di-AMP detection.



Source: https://www.rcsb.org/structure/6HVL

Technology:

Scientists at Albany Medical College developed a method for selectively detecting and quantifying c-di-AMP using engineered molecular recognition elements. By employing a highly specific binding agent, exhibiting selective affinity for c-di-AMP while minimizing cross-reactivity with structurally similar nucleotides. These binding agents can be integrated an enzyme-linked immunosorbent assays (ELISA). By optimizing binding affinity and specificity, this detection platform enables precise measurement of c-di-AMP concentrations in complex biological samples. This technology will improve our understanding of bacterial signaling molecule c-di-AMP, which may impact on prevention and treatment of bacterial infections.

Intellectual Property

US10048254B2

Technology Readiness

Available for Licensing

Advantages:

- **High Specificity**
- **Enhanced Sensitivity**
- **Versatility**

Applications:

- **Bacterial Pathogenesis Research**
- **Diagnostic Development**
- **Therapeutic Target Identification**

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