Monitoring the synthesis of the bacterial cell wall in real time

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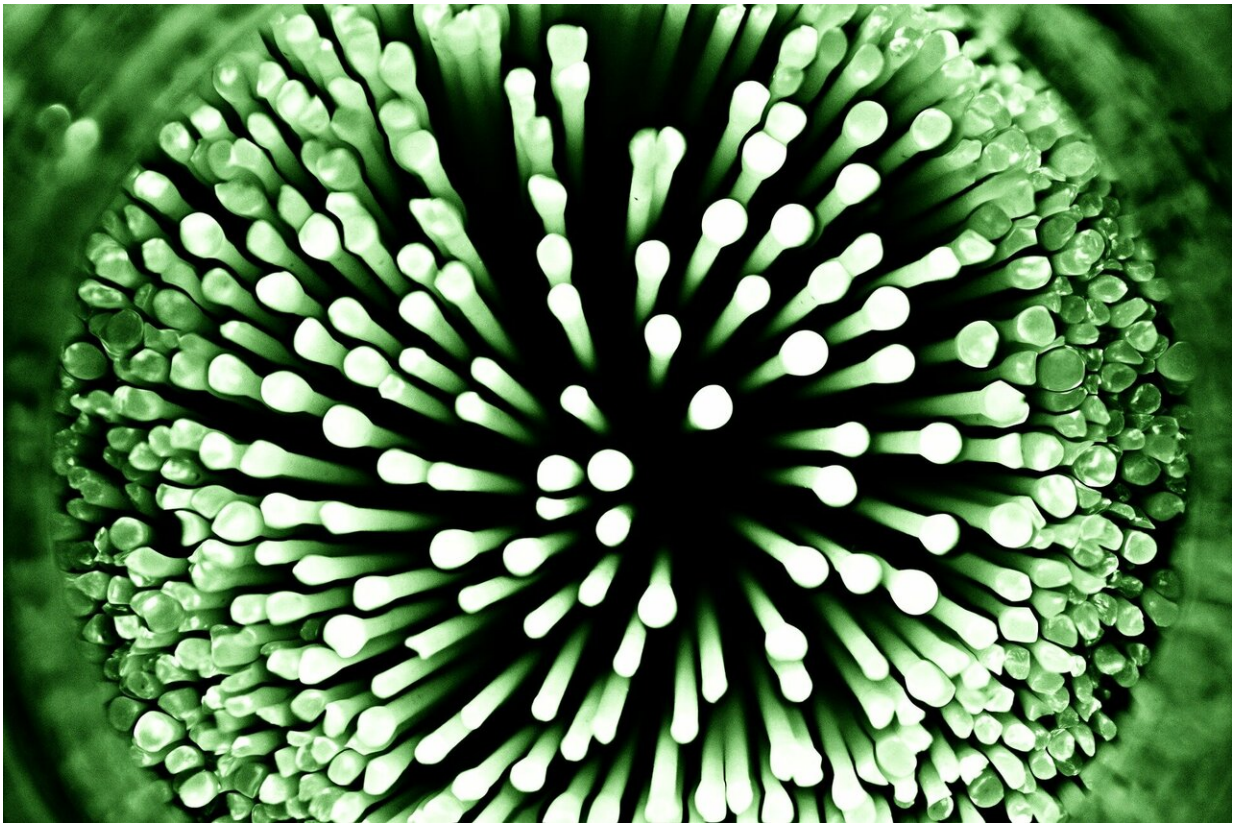

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A significant breakthrough has just been made in the world of biochemistry: a team of international researchers has developed a revolutionary method to monitor in real time an essential element of

bacterial growth.

Since the new technique allows the cell wall of bacteria to be fluorescently "stained" in a new way, the discovery could have major impacts on the development of new antibiotics, according to the researchers.

Their study on the subject has just been published in the journal *Nature Chemistry*. The team is led by Yves Brun, a professor of microbiology at Université de Montréal, and Michael S. VanNieuwenhze, a chemist at Indiana University in Bloomington.

"Think of a car: if you know how the engine works, you will know which part you need to replace in order to repair it or, conversely, which part to remove to prevent it from working," said Brun. "The same goes for bacteria: if you can identify a potential target, you can attack it more easily."

By using amino acids with fluorescent properties, the researchers were able to make visible the main component of the cell wall called peptidoglycan, essential for the morphology and survival of almost all bacteria.

The ability of these amino acids to become fluorescent when they are added at the site of peptidoglycan synthesis provides a powerful new tool for real-time microscopic observation of this synthesis and, therefore, of its dynamics and orientation.

From now on, researchers will be able to visualize the dynamics of cell wall synthesis and thus test a variety of compounds more quickly and at a lower cost, as well as test their effectiveness in inhibiting peptidoglycan synthesis.

At a time when antibiotic resistance is becoming of increasing concern around the world, the development of such an effective screening method for harmful bacteria is timely, the researchers believe.

More information: Yen-Pang Hsu et al. Fluorogenic d-amino acids enable real-time monitoring of peptidoglycan biosynthesis and high-throughput transpeptidation assays, *Nature Chemistry* (2019). DOI: 10.1038/s41557-019-0217-x

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