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Extended Abstract

Quorum Sensing in Cyanobacteria and the Origin of Blooms. Lessons for Human Pharmacology †

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Quorum Sensing (*QS*) is a bacterial communication system involved in pathogenicity, virulence, and resistance. On the other hand, the presence of cyanobacteria in water bodies has important implications for public health, because the production of toxins causes death at lower concentrations. The biochemical mechanism of cyanobacterial blooms is unclear, although some causative agents have been proposed, such as high levels of N and P, high temperature, and radiation, among others. Autoinducer lactones of *QS* have not been detected without doubt in cyanobacteria but could explain the formation of blooms in a more rational way.

In his paper, we reported the evaluation of nine homoserine lactones on the growth, the production of cyanotoxins, and colony formation in the cyanobacteria *Microcystis aeruginosa* and *Cylindrospermopsis raciborskii*. *N*-dodecanoyl-L-homoserine lactone was the main inducer of the growth of *M. aeruginosa*, and N-Butyryl-DL-homoserine lactone for *C. raciborskii* (177% and 260%, respectively). In addition, *N*-octanoyl-L-homoserinelactone induced the formation of colonies in *M. aeruginosa*. The production of microcystin toxin was greater with 3-oxododecanoyl-homoserine lactone and hexanoyl-homoserine lactone.

All these results conclusively show that *QS* is a common phenomenon in bacteria and that autoinducers molecules accomplish specific functions in the pathogenic processes. Therefore, the understanding of the chemical factors involved could give valuable tools for the discovery of new drugs and pharmacologic treatments. Recently, the role of several drugs, including acetaminophen, induce *QS* in *Klebsiella pneumoniae*. Thus, it is probable that substances structural or functionally related to these lactones and from human activity (industry, agrochemical, drug, and food) can trigger the blooms and bacterial resistance to antibiotics.

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