Elucidation of the New Infection Mechanism of Pseudomonas aeruginosa

The Environmental Molecular Biology Laboratory (Chief Scientist: Dr. Toshiaki Kudo), Discovery Research Institute, have announced that a new mechanism involved in infection of *Pseudomonas aeruginosa*, an opportunistic pathogen that cause nosocomial infection, was revealed.

A research team discovered "Sha system," which is an ion transport system that exports sodium ion (Na⁺) out of the cell in exchange of proton (H⁺), and has studied to examine the involvement of this system in infection of pathogens such as *P. aeruginosa*.

The Sha system consists of multiple membrane proteins and is responsible for a strong homeostatic capacity to maintain H⁺ and Na⁺ ions at constant concentrations in the bacterial cell.

The research team constructed a mutant of *P. aeruginosa* that has a deletion of the largest gene in the system and examined the virulence using mouse infection models. The mutant *P. aeruginosa* exhibited an attenuated virulence and also a decrease in the colonization of the infected organs compared to the wild type *P. aeruginosa*.

This study clarified that the Sha system is involved in infection. It is likely that the strong homeostatic capacity conferred by the Sha system has an important role in adaptation to the Na⁺ environment inside the host, which helps the infection of the pathogen.

This research was conducted in collaboration with Astellas Pharma Inc. and Yokohama City University (YCU). The result of this research was published in the American Society for Microbiology journal "*Journal of Bacteriology*" dated August 1.
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