SMCR, A LUXR HOMOLOGUE OF *VIBRIO VULNIFICUS*, CONTROLS BIOFILM DISPERSAL

Seung Min Kim, Jin Hwan Park, and Sang Ho Choi
Department of Agricultural Biotechnology, Seoul National University, Seoul 151-921, South Korea
choish@snu.ac.kr

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Introduction.
Quorum sensing is a cell-cell communication system known to control many bacterial processes. LuxR is a transcriptional activator of the luciferase operon of *Vibrio harveyi* and known as a quorum sensing master regulator. SmcR, a LuxR homologue of *Vibrio vulnififus*, appears to regulate numerous genes involved in the virulence and survival of the pathogen.

Methods.
In order to elucidate the possible roles of quorum sensing in the pathogenesis of *V. vulnificus*, biofilms of the *smcR* mutant and parental wild type were used to infect mice and their virulence and colonization capacity were compared. Moreover, the influence of SmcR on the biofilm development *in vitro* and in tissue cultures was examined and the SmcR-regulated genes possibly involved in the biofilm development were searched using a microarray.

Results.
When biofilm cells were used as an inoculum, the *smcR* mutant was impaired in virulence and colonization capacity in the infection of mice. The disruption of *smcR* also resulted in a decrease in histopathological damage in mouse jejunum tissue. These results indicated that SmcR is essential for *V. vulnificus* pathogenesis. Moreover, the *smcR* mutant exhibited significantly reduced biofilm detachment. Upon exposure to INT-407 host cells, the wild type, but not the *smcR* mutant, revealed accelerated biofilm detachment. The INT-407 cells elevated the expression of *smcR*, indicating that the accelerated biofilm detachment by the host cells is attributed to the increased cellular level of SmcR. Whole genome microarray analysis revealed that the genes primarily involved in biofilm detachment and formation are up- and down-regulated by SmcR, respectively. Among the SmcR-regulated genes, *vvpE* encoding an elastolytic protease was the most up-regulated and the purified VvpE appeared to stimulate the detachment of the preformed biofilm in a concentration-dependent manner.

Conclusions.
The results suggest that the quorum sensing regulator SmcR enhances detachment of the *V. vulnificus* biofilms entering the host intestine and thereby promotes dispersal of the pathogen to new colonization sites, which is crucial for pathogenesis.

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