CI-4

Transcriptional Organization and Regulation Mechanism of SPI2 in *Salmonella enterica* Serovar Typhimurium

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Salmonella pathogenicity island (SPI)-2 at 30 centisome of *Salmonella* is required for its intracellular replication and systemic infection of mice. SsrAB is a two component regulatory system that regulates the expression of genes encoding the components of SPI-2 type III secretion system (TTSS) as well as genes encoding SPI-2 effectors located both in SPI-2 and elsewhere in the chromosome. SsrA is a sensor kinase sensing changes in the environment and phosphorylates the response regulator, SsrB. In this study, we elucidate the transcriptional organization and the regulation mechanism of SPI-2. Using RT-PCR, we found SPI-2 genes cluster was divided into several operons and searched for +1 sites of the respective operons. Chromatin immunoprecipitation(ChIP) assay revealed SsrB bound to the promoter region of each operon, indicating direct regulation of SPI-2 expression by SsrB. As a factor involved in the regulation of SPI-2, we analyzed the effect of acidic pH on the expression of SPI-2 genes. Low pH increased the expression level of *ssrB* and enhanced the binding affinity of SsrB for each SPI2 gene. This acidic shock induction of SPI2 expression was decreased in the absence of OmpR, implying that OmpR is involved in the acidic induction of SPI2. These results suggest that modulation of SsrB binding affinity for the target promoter by sensing changes in the environmental conditions plays an important role in SPI-2 gene regulation.

Key words: *Salmonella typhimurium*, *Salmonella* pathogenecity island (SPI)-2, *ssrAB*, acidic pH, OmpR