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The Antigenic Murein Lipoprotein is Involved in Immune Responses of *Salmonella typhimurium*

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While *Salmonella* infects host, various virulence factors are required for pathogenesis. Deletions into genes involved in virulence for *Salmonella* pathogenesis has been used as attenuated *Salmonella* vaccine. Although these attenuated *Salmonella* vaccines induce protective immunity, it has not been clearly known about the *Salmonella* antigens which contribute to induce immune responses. To investigate immunodominant *Salmonella* surface antigens, attenuated *S. typhimurium* (Δ*crp*) live vaccine was administrated into BALB/c mouse with a single 1 X 10^9CFU dose through the oral route. The sera collected from immunized mice were used to detect the antigens in *S. typhimurium* cell lysates by immunoblot assay. An approximately 8.8 kDa immunodominant protein band was detected by immunoblot. The protein purified and analyzed to identify the protein through a MALDI-TOF assay system. The protein was verified as Lpp, which is major bacterial outer membrane lipoprotein component of Gram negative bacteria. To know roles of Lpp in *Salmonella* pathogenesis, we construct a *S. typhimurium lpp* deletion mutant, CK23. The *lpp* gene deletion in CK23 was confirmed by DNA size comparison of PCR amplified DNA fragment of *lpp* region and elimination of 8.8 kDa protein band in immunoblot analysis. To investigate whether *S. typhimurium* CK23 had altered virulence properties, virulence test was performed and it had completely avirulence in mice. In conclusion, the antigenic lipoprotein, Lpp plays an important role in the virulence of *S. typhimurium*.

Key word: *S. typhimurium*, pathogenesis, antigen, Lpp

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Requirement of Fur for the Full Induction of *dps* Expression in *Salmonella enterica* Serovar Typhimurium

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The Dps protein, which is overexpressed in harsh environments, is known to play a critical role in the protection of DNA against oxidative stresses. In this study, The roles of Fur in the expression of the *dps* gene in *Salmonella* and the protection mechanisms against oxidative stress in *Salmonella* cells pre-exposed to iron-stress were investigated. Two putative Fur boxes were predicted within the promoter region of the *S. typhimurium dps* gene. The profile of *dps* expression perfomed by the LacZ reporter assay revealed growth-phase dependency regardless of iron-status under the culture conditions. The *fur* mutant, χ4659, evidenced a reduced level of β-galactosidase as compared to the wild-type strain. The results observed after the measurement of the Dps protein in various *Salmonella* regulatory mutants were consistent with the results acquired in the reporter assay. This evidence suggested that Fur performs a function as a subsidiary regulator in the expression of *dps*. The survival ability of *Salmonella* strains after exposure to oxidative stress demonstrated that the Dps protein performs a pivotal function in the survival of stationary-phase *S. typhimurium* against oxidative stress. *Salmonella* cells grown in iron-restricted condition required Dps for full protection against oxidative stress. The CK24(Δ*dps*) cells grown in iron-replete condition survived at a rate similar to that observed in the wild-type strain, thereby suggesting the induction of an unknown protection mechanism(s) other than Dps in this condition

Key word: Dps, *S. typhimurium*, iron metabolism, Fur, oxidative stress