

Phenotypic and immunologic characteristics of *Salmonella* lacking RNA modification enzymes

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Deletion of tRNA modification enzymes *gidA* and *mnmeE* significantly attenuated *Salmonella* virulence. Transcriptome and proteome analyses indicated that expression of several virulence factors was significantly altered. Mice immunized with the *gidA* mutant were protected against a lethal dose of wild-type (WT). The mechanistic basis of protection afforded by immunization of mice with the *gidA* mutant was investigated using flow cytometry and several immunological techniques. Data from this study indicated that both humoral and cellular immunity played a role with the humoral immune response potentially being the main mechanism of protection.

GidA together with *MnmE* thought to catalyze modification of tRNA which is required for correct translation during gene expression. Examination of relative contribution of *GidA* and *MnmE* in modulation of *Salmonella* virulence indicated various degree of attenuation and that *GidA* and *MnmE* bind together and alters *Salmonella* tRNA modification.

GidB, a methyltransferase enzyme, was identified as being responsible for methylation of 16S ribosomal RNA (rRNA) in *Escherichia coli* and other bacteria. Deletion of *Salmonella gidB* gene indicated a compromised overall bacterial fitness, significantly reduced motility and showed a filamentous morphology under the stress of nalidixic acid. Most importantly, deletion of *gidB* conferred high-level resistance to the aminoglycoside antibiotics streptomycin and neomycin. This study determined the methylation site for the WT *Salmonella*. Taken together, these data indicated that *GidA*, *GidB* and *MnmE* enzymes play a significant role in modulation of biological and virulence characteristics and alteration of antibiotic susceptibility in *Salmonella* under stress conditions.

Biography

Amin A. Fadl obtained his Ph.D. from University of Connecticut, Storrs and completed a postdoctoral training at the University of Texas Medical Branch. Currently, he is an assistant Professor of Microbiology at the University of Wisconsin-Madison. His research focuses on the molecular pathogenesis, immune and inflammatory responses, and host-pathogen interaction of *Salmonella*. He has published more than 44 papers in reputed journals.

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