Salmonella enterica Typhimurium fljBA operon stability: implications regarding the origin of Salmonella enterica 4,5,12:i:-

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ABSTRACT. Salmonella enterica subsp enterica serovar 4,5,12:i:- has been responsible for many recent Salmonella outbreaks worldwide. Several studies indicate that this serovar originated from S. enterica subsp enterica serovar Typhimurium, by the loss of the flagellar phase II gene (fljB) and adjacent sequences. However, at least two different clones of S. enterica 4,5,12:i:- exist that differs in the molecular events responsible for fljB deletion. The aim of this study was to test the stability of the fljBA operon responsible for the flagellar phase variation under different growth conditions in order to verify if its deletion is a frequent event that could explain the origin and dissemination of this serovar. In fact, coding sequences for transposons are present near this operon and in some strains, such as S. enterica Typhimurium LT2, the Fels-2 prophage gene is inserted near this operon. The presence of mobile DNA could confer instability to this region. In order to examine this, the cat (chloramphenicol acetyltransferase) gene was inserted adjacent to the fljBA operon so that deletions involving this genomic region could be identified. After growing S. enterica chloramphenicol-resistant strains under different conditions, more
than $10^4$ colonies were tested for the loss of chloramphenicol resistance. However, none of the colonies were sensitive to chloramphenicol. These data suggest that the origin of *S. enterica* serovar 4,5,12:i:- from Typhimurium by *fljBA* deletion is not a frequent event. The origin and dissemination of 4,5,12:i:- raise several questions about the role of flagellar phase variation in virulence.

**Key words:** *Salmonella enterica; fljBA* operon; Flagellar phase variation; Mutation; λ-red; Serovar 4,5,12:i:-