THE STUDY OF THE INTERACTION OF FLIG AND H-NS IN
SALMONELLA TYPHIMURIUM
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The H-NS protein in Salmonella Typhimurium condenses DNA allowing 1mm of DNA to reside within a 1 x 2 micron cell body. H-NS also binds to a single protein in the cell: the flagellar motor protein FliG. The purpose of this interaction is not understood. This project focuses specifically on the interaction between FliG and H-NS. Tryptophan substitutions at amino acid positions 126 and 160 of E. Coli FliG were found defective in binding H-NS. Using targeted mutagenesis, phage transductions and various motility and other phenotypic tests, mutations were made in positions 126 and 160 of Salmonella FliG. We hypothesized that the role of H-NS:FliG interaction was to bring the DNA encoding the flagellin filament gene (fliC) to the flagellar base for localized transcription to facilitate the flagellar assembly process.

The goal was to determine if this DNA localization mechanism could be replaced by many copies of the fliC gene expressed from a plasmid vector. The fliC plasmid vector was placed into the FliG126::Trp and FliG 160::Trp strains. Complementation of the H-NS binding defect by the fliC plasmid vector was tested using a plate motility assay for flagellar production and function. The fliC did not complement the FliG mutant alleles for motility and the cells exhibited no change (non-motile), or reduced motility. Immunofluorescence microscopy was also used to visualize flagellar assembly. Analysis of the microscopy images revealed that the mutants were assembling flagellar filaments. Thus, the tryptophan mutants were able to assemble filaments but had a defect in the rotation of their flagella. From these findings, it is not clear that H-NS is involved in the localization of flagellin filament at the flagellar base.