PROTEINS AND TRANSCRIPTS INVOLVED IN MINI-F MAINTENANCE

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ABSTRACT

The aim of the work described in this thesis was to understand the maintenance systems of the F plasmid of *Escherichia coli*. The work was centered on the biochemical studies of the primary replicative fragment of F, f5.

1. From an analysis of the protein species produced by miniF-vector hybrid plasmids in *E. coli* minicells, seven proteins were found to be encoded by f5. Similarly, the secondary F replicon, f7, was found to code for at least three proteins.

2. The f5-specific proteins were further characterized by determining their isoelectric points and molecular weights in two-dimensional gels.

3. Using transposon-induced and deletion mutants of miniF, the structural genes of the seven f5 proteins were mapped.

4. Analysis of the amounts of proteins made by transposon-insertion mutants revealed that some miniF proteins control the expression of miniF genes. These results suggested possible mechanisms of coordination between the three f5 maintenance systems (*ccd*, *rep* and *par*).

5. The polarities of the f5 transcripts synthesized in minicells were determined by hybridization with f5 DNA cloned into single-stranded phage M13 vectors. The results were consistent with the gene mapping data, in that the directions of transcription of the seven f5 structural genes are uniformly rightwards.

6. In addition, the RNA-DNA hybridization experiments revealed the existence of untranslated leftward transcripts produced from the regions involved in f5 replication and partition.