The gntP Gene of Escherichia coli Involved in Gluconate Uptake. GntP, a high-affinity gluconate permease.

The gntP gene, located between the fim and uux loci in Escherichia coli K-12, has been cloned and characterized. Nucleotide sequencing of a region encompassing the gntP gene revealed an open reading frame of 447 codons with significant homology to the Bacillus subtilis gluconate permease. Northern (RNA) blotting indicated that the gntP gene was monocistronic and was transcribed as an mRNA with an apparent molecular size of 1.54 kb. The transcriptional start point was determined by primer extension analysis. The gntP gene was found to be under catabolite repression and was not induced by gluconate. Also, expression seemed to be stringently controlled. Several observations indicated that the GntP protein is an inner membrane protein; it contains characteristic membrane-spanning regions and was isolated predominantly from the inner-membrane fraction of fractionated host cells. A topology analysis predicted a protein with 14 membrane-spanning segments. The inability of a mutant strain to grow on gluconate minimal medium could be relieved by introduction of a plasmid encoding the gntP gene. Finally, the kinetics of GntP-mediated gluconate uptake were investigated, indicating an apparent Km for gluconate of 25 mM.