CABOHYDRATE UTILIZATION PATHWAYS ENCODED IN THE GENOME OF DENTAL PATHOGEN *Streptococcus mutans* UA159

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**Abstract:** *Streptococcus mutans* is a gram-positive coccus-shaped bacteria that is the major cause of human dental caries (tooth decay) worldwide. *Streptococcus mutans* UA159 was isolated in 1982 from a child with active dental caries. The genome sequence of UA159 was published in 2002. It is a facultative, non-motile, non-sporulating mesophile with optimum temperature of 37 degrees centigrade. The breakdown of carbohydrates available through foods such as milk provides a source of nutrient to *S. mutans*. The objective of this investigation was to determine the number and types of carbohydrate utilization pathways encoded in strain UA159. The genome statistics and carbohydrate utilization pathways annotation were obtained from the Integrated Microbial Genome system (IMG). The genome size is 2,030,921 bases with 87.19% of the bases DNA coding. The G+ C content is 36.83%. The total genes predicted was 2059 with 1960 (95.19%) and 99 (4.81%) predicted as protein coding and RNA genes. No Pseudo genes were predicted. Out of the possible 73 carbohydrate utilization pathways documented in the IMG system, 26 were annotated as present in strain UA159. A total of 35 unique genes were linked to these collections of pathways. The gene count linked to these pathways ranged from 1 to 6. Two pathways had more than 5 genes. D-galactose 6-phosphate degradation via tagatose 6-phosphate pathway was associated with 6 genes. Furthermore Galactose catabolism by De Ley-Doudoroff pathway was associated with 5 genes. A total of 14 pathways were associated with one gene. Analysis of the gene lists led to the identification of a cluster of 6 genes on the chromosome involved in carbohydrate utilization. We are examining the chromosomal synteny and sequence characteristics of the prioritized genes to further understand the evolution of carbohydrate utilization in *S. mutans*.

**Keywords:** Carbohydrate metabolism, dental caries, *Streptococcus mutans*

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