Genomic Library Construction for the Archae Halorubrum salsolis Recently Discovered in the Great Salt Lake

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Halorubrum salsolis is a recently discovered halobacterium isolated from the Great Salt Lake in the western United States. H. salsolis is known for its high tolerance to UV radiation and salt levels. It has also been found to be viable after being dried into a crystal solid for an extended period of time. Due to these unique properties we wanted to obtain novel DNA sequence of H. salsolis, hoping to identify and analyze genes inside this novel Archaeon to discover what proteins support life in such environments. Transfer of H. salsolis saline and UV resistance genes into wheat, corn, and other crops could help solve world hunger by increasing crop yields or tolerance in high salinity soils. We began genomic library construction by isolating and purifying H. salsolis DNA, followed by digestion with the restriction endonuclease HindIII. DNA fragments were then ligated into pBluescript plasmid vectors, and transformed into heat-shock competent E. coli 5a for replication. Disruption of the lacZ gene allowed for blue/white color colony selection, and plasmids were isolated from white colonies. Insertion of H. salsolis DNA into isolated plasmids was confirmed for eight colonies by HindIII digestion and electrophoresis. Each plasmid was sequenced at the SLCC DNA sequencing center, and compared to sequences in existing databases by BLASTn. We identified 5 unique proteins, but these genes are all present in bacteria with low salinity tolerance. We conclude that future approaches to identify salinity genes should focus on complementation of H. salsolis DNA into salt- and UV-susceptible sister taxa.

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