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56082. *Mathematical Representations of Ciliate Genome Decryption*. Preliminary report.

Ciliates are unique unicellular organisms that each contain a scrambled version of their own DNA which must be unscrambled for proper gene expression. Ciliates have developed three DNA operations for this purpose: reversals, block interchanges, and excisions. Using integer permutations to represent scrambled DNA segments, we can develop a simple mathematical model for each of these operations. This model can be enhanced by visualizing permutations of integers as directed graphs. Studying ciliate DNA operations using these numeric and visual representations has yielded a number of curious insights into the mechanics of ciliate genome unscrambling. In this talk we present some of our mathematical findings. (Received February 16, 2013)