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Makkuni Jayaram* (jayaram@icmb.utexas.edu), Mol Genetics & Microbiology, 1 Univ Station A5000, UT Austin, Austin, TX. *Analyzing DNA Transposition and Recombination by Difference Topology*. Preliminary report.

DNA transactions in biological systems are often carried out by multi-subunit protein assemblies that confer a defined topology on their DNA target sites. Such 'topological filters' are thought to stabilize DNA-protein configurations that are conducive to triggering the chemical steps of the respective reactions. 'Difference topology' is a simple method for deciphering the DNA topology within complex DNA-protein machines that are not readily amenable to standard structural analyses. The logic is to trap the crossings formed by distinct DNA segments by tying them into knots or links by site-specific DNA inversion and deletion, respectively, carried out by a recombinase. The number of such crossings can then be counted by analytical methods such as gel electrophoresis or electron microscopy. We have applied difference topology to decipher the topological, geometric and mechanistic aspects of DNA transposition and site-specific recombination reactions. (Received February 11, 2009)