1020-92-78 **Alexander Vologodskii*** (alex.vologodskii@nyu.edu), Department of Chemistry, New York University, 31 Washington Place, New York, NY 10003. *Protein-induced Local DNA Bends Regulate Global Topology of Recombination Products.*

Topology is a global property of circular DNA molecules, and it is impossible to design a machine which could find out topology by using only a local interaction with these long molecules. Enzymes are very small compared with DNA molecules, so they belong to the category of such locally acting machines. However, they can change DNA topology in a desired direction by using internal statistical properties of DNA molecules rather than by determining their topology. We provide an explanation for how such directed topological transformation is accomplished by the site-specific recombinases. The recombinases introduce local bends into short DNA segments, and these bends affect the global statistical properties of circular DNA molecules. Although the result of each topological transformation remains to be random, the local bends can dramatically change the probabilities of different outcomes of these transformations. This explanation of the recombination outcomes is strongly supported by the experimental data. (Received August 15, 2006)