

1161-92-61

Neil Osheroff* (neil.osheroff@vanderbilt.edu), Department of Biochemistry, 654 Robinson Research Building, Nashville, TN 37232-0146. *Recognition of DNA Topology by Topoisomerases.*

The double helical structure, length, and compaction of DNA, along with normal nucleic acid processes, generate a number of topological problems that the cell must be able to resolve in order to survive. Examples are DNA under- and overwinding (negative and positive supercoiling), knotting, and tangling. Levels of DNA supercoiling strongly affect processes such as replication and transcription and DNA knots and tangles must be removed in order to open the double helix and segregate chromosomes during mitosis. Topological issues in DNA are resolved in human and bacterial cells by enzymes called topoisomerases. Type I topoisomerases regulate DNA supercoiling by generating transient single-stranded breaks in the genetic material. Type II topoisomerases regulate DNA supercoiling and remove knots and tangles by generating transient double-stranded breaks in the double helix. This presentation will familiarize the audience with DNA topoisomerases, how they resolve topological issues, and how they discern the geometry of DNA supercoils. (Received August 07, 2020)