Physiological regulation of eukaryotic topoisomerase II.

Topoisomerase II is an essential enzyme in all organisms with several independent roles in DNA metabolism. In this article we review our knowledge on the regulation of the expression and catalytic activity of topoisomerase II in both lower and higher eukaryotes. Current data indicate that the regulation of topoisomerase II gene expression is complex, with positive and negative controls in evidence at the level of both promoter activity and mRNA stability. Similarly, the activity of the mature enzyme can be regulated by the action of several different protein kinases. Of particular interest is the cell cycle-dependent phosphorylation of topoisomerase II, including multiple, mitosis-specific modifications, which are proposed to regulate the essential chromosome decatenation activity of the enzyme.