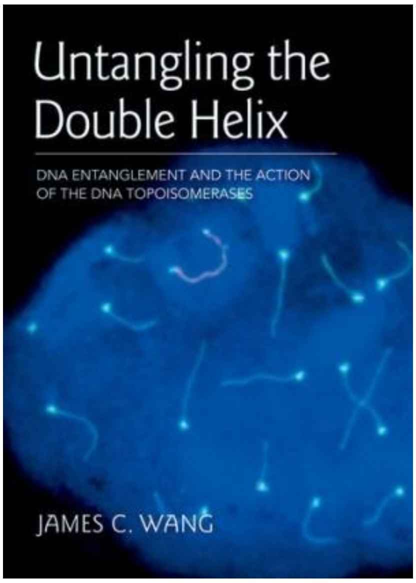

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Untangling the Double Helix: DNA Entanglement and the Action of the DNA Topoisomerases

By James C. Wang

Cold Spring Harbor Laboratory Press,U.S. Hardback. Book Condition: new. BRAND NEW, Untangling the Double Helix: DNA Entanglement and the Action of the DNA Topoisomerases, James C. Wang, The problem of unraveling two intertwined strands during the duplication of DNA was recognized shortly after the proposal of the DNA double helix structure in 1953. A group of enzymes called DNA topoisomerases solve this problem by breaking and rejoining DNA molecules in a controlled manner, thereby allowing strands to be passed through each other and thus untangled - not just during DNA replication, but also during many other basic cellular processes. Because of their intimate involvement in the workings of the cell, topoisomerases are also the logical targets of many antibiotics (including Cipro) and anticancer agents. This book, written by James Wang, the discoverer of the first topoisomerase and a leader in the field since, presents ten chapters covering the historical backdrop of the DNA entanglement problem and the discovery of the DNA topoisomerases, how DNA topoisomerases perform their magic in DNA replication, transcription, genetic recombination and chromosome condensation, and how they are targets of therapeutic agents. The book should appeal to readers from undergraduates upwards with interests in the biological and...

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The double-helical nature of DNA and the anchoring of DNA to nuclear structures result in a number of topological problems during replication and transcription, mainly due to DNA-tracking polymerases and heli-cases. These activities cause the accumulation of positive supercoils ahead of the moving polymerase and negative supercoils behind it (Liu and Wang 1987; Brill and Sternglanz 1988; Giaever and Wang 1988; Wu et al.Â 1987). Several studies suggest that topoisomerase I recognizes gross structural features of the DNA double helix rather than base se-quence per se. Particularly, it seems that bent DNA is the substrate of choice. This is reflected in the preferential action on highly supercoiled or otherwise curved DNA (Camilloni et al. 1988, 1989; Caserta et al. Double-stranded DNA also allows your body to detect errors when copying DNA and fix many of them.Â 2) A single strand is not as geometrically constrained as a double helix and this prevents unwanted molecular movements that may disrupt the DNA structure. 3) Having a second strand means that if there is some DNA damage is one strand, the other strand can be used to repair it. Thus, the damage is not fatal and can be easily repaired. In Untangling the Double Helix, Wang offers a very accessible and thorough introduction to DNA topoisomerases, from their basic properties to their roles in biology and medicine. The author s important contributions to the development of the field allow him to provide a lively account of the discovery and subsequent characterization of this family of enzymes. The book is enjoyable and easy to follow, with clear illustrations to help explain several major points The book successfully aims at a general audience not necessarily familiar with topoisomerases or their biology. Anyone wishing to learn more about these enzymes or some of the ideas behind their discovery will find Wang s account illuminating. Biophysicist Maxim Frank-Kamenetskii on DNA supercoiling, topoisomerases, and enigmatic organisation of chromosomes.Â The double-strand DNA model was postulated by Watson and Crick in 1953 and it marked the beginning of a new era of molecular biology and later of biotechnology. This was the beginning of modern biology â€” the discovery of the double helix. In the beginning, not everybody embraced the model. Very soon, however, it became clear to many researchers that this model was the reality.