
Book reviews

Cold Spring Harbor Symposia on Quantitative Biology. Volume XLVII: Structures of DNA. Part 1 and 2. Cold Spring Harbor: Cold Spring Harbor Laboratories 1983. xxi + xv + 1234 pp., several figs., several tabs.

Once more Cold Spring Harbor Laboratories have provided us with a record of their symposia on Quantitative Biology, which sets the authoritative standard in the subject area. The two volumes contain 135 chapters, all dealing with aspects of "Structures of DNA" and contributed by world experts. The standard of reproduction of these volumes is extraordinarily high, a feature being the high quality of figures and diagrams. This is essential to these volumes dealing as they do with the structures of such a complicated macromolecule.

As pointed out by J. D. Watson, who organised this symposium, when he and Crick first proposed the double helical structure in 1953, it seemed deceptively simple. Now, 30 years later, the variety of perturbations known to be operating on the basic double helix is bewildering. Not only can it be overcoiled or undercoiled, but it can also be shown to turn to the left or right. All of these complexities are dealt with in these two volumes. An introduction by Rich explains these possibilities and puts forward the thesis that DNA is a molecule in dynamic equilibrium in which a number of stable conformations exist, depending to some extent on the nucleotide sequence. The first volume deals predominantly with physical studies of the various conformations, and the second volume with enzymic and base sequence aspects.

Included in the first volume are chapters that build on Rich's discovery of left-handed Z-DNA, as an alternative to

right-handed B-DNA. There is of course still much speculation on how important Z-DNA is in nature and what role it plays. Included are chapters dealing with hairpin or cruciform DNA configurations – these are closely involved with supercoiling. Following are chapters relating to many aspects of chemically altered DNA, including drug intercalation and carcinogen-induced conformations. Chemical synthesis of DNA sequences finds a place in this first volume, the methodology of rapid phosphotriester synthesis is fully explained. The procedures show how the non-chemist can routinely synthesize probes, genes and gene-control regions. The first volume is completed by a series of articles on DNA protein interactions, illustrated by examples from the *lac* operon and bacteriophage systems, and on the nucleosome structure.

The second volume carries on with the enzymic, biochemical and biological implications of DNA structures, building upon the structural edifice proposed by the chemists and crystallographers. Methylation, replication, gyrases and topoisomerases, recombination, mutation, transcription, repetitive sequences and gene organisation are all dealt with in this second volume. Taken as a whole, the two volumes present as complete a record of our present understanding of "DNA structure" as can be obtained anywhere. They will stimulate further work in this area, and show us all the structural possibilities built into the DNA molecule and how much we yet need to learn about the mechanics of its biological functions.

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