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Book reviews

Laskey, R. A.; Banks, G. R.; Nurse, P. M.: Eukaryotic Chromosome Replication. London: The Royal Society 1987. 180 pp. 68 figs. 20 tabs. Hard bound.

Since recent overviews on the replication of eukaryotic chromosomes are scarce, these Proceedings of the Royal Society Discussion Meeting (held on the 10th and 11th of December 1986) are a welcome compilation of up-to-date articles on this subject. Until recently, eukaryotic chromosome replication has not obtained the attention is should have, especially if one realizes that chromosome replication is crucially important for the survival of a multicellular organism. Incomplete replication and inaccurate division will result in chromosome breakage and mutations; failures of the regulatory mechanism will result in unrestricted cell proliferation and will contribute to cancer. The introduction of new experimental systems for eukaryotes has opened new ways to increase our knowledge in this field. The papers in this volume illustrate how promising new results can be.

Since bacterial systems have been used as models for studying several aspects of replication (and gene expression/control), it is understandable that Bruce Alberts has been asked to emphasize features that are common to several prokaryotic systems. Similar approaches can thus be used for mammalian cells and their viruses in studying the role of different proteins in cellular replication. The calf thymus DNA polymerase α is described as a replication competent holo-enzyme, and the porcine circovirus cell-free replication system is used for in vitro dissection and reconstitution (Hübscher et al.). The cell-free replication systems for Adenovirus and SV 40 have been used to study the proteins required for DNA synthesis (Kelly et al.). Wobbe et al. describe the partial reconstitution of SV 40 DNA replication with purified components of known function, including the complex role of the multi-functional T-antigen in papovavirus DNA replication. A detailed study on the action of the SV 40 large T-antigen in replication is presented by Mole et al. These studies clearly show that a combination of protein expression, cloning of gene fragments, and detailed immunochemical analysis with monoclonal antibodies can be used to unravel this complex protein machinery. The use of different types of (cell-free) in vitro systems has permitted investigations on the processes of initiation of replication at the two separate and distinct origins of animal mitochondrial DNA replication (Clayton), on aspects of initiation of DNA replication in *Xenopus* egg extracts and involvement of sequence specificity (Blow et al.), and the identification of essential replication activities for SV 40 (Fairman et al.).

Since yeast provides an excellent model system for studying chromosomal replication during S-phase (and the segregation of the replicated chromosome at mitosis) and has the added advantage of being amenable to genetic and physiological analysis, it is logical that studies on yeast are included. Simanis et al. illustrate the power of this approach in their studies on cell cycle control in the fission yeast, and Kearsy presents results on the specificity of DNA sequences involved in the initiation of DNA replication in yeast chromosomes. Intracellular mitogenic signals, which are responsible for initiating the sequences of events leading to the onset of DNA synthesis, have been studied by Berridge.

This volume ends with studies on the complex architecture of the chromosome, dealing with the different levels of DNA packing in chromosomes. The bending of DNA into nucleosomes and its wider application is discussed by Travers and Klug; the structure-function relation between chromosome organization and gene expression by Mirkovitch et al.

In conclusion, this set of articles takes a broad view of chromosome replication in eukaryotic organisms. It surveys a wide range of related topics and illustrates in detail recent advances in this field. Students and scientists interested in the different aspects of chromosomal replication will find this volume a useful and inspiring guide. Furthermore, it will be a good stimulus to biochemists, geneticists, molecular biologists and cytologists to continue their cooperative efforts in obtaining more insight into the complex mechanism of eukaryotic chromosome replication.

This volume was first published in the Philos. Trans. R. Soc. London Ser. B 317 (no. 1187), 393–574.

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Winnacker, E.-L.: From Genes to Clones. Introduction to Gene Technology. Weinheim: Verlag Chemie 1987. 634 pp. Several figs. and tabs. Soft bound. DM 60,–.

Due to an increasing demand for literature on gene technology during the last few years, many books describing either basic aspects or special methods in this field or both, have been published. One of the books that compiled a lot of valuable information was the first German edition entitled *Gene und Klone*, edited in 1984. It gives an excellent introduction to gene technology, and many scientists and students have profited from studying it. Its success in German-speaking countries initiated an English translation. Under the title "From Genes to Clones", the text is now available, and the contents are a useful combination of descriptions of the development of cloning vectors in different species and of general principles in genetic engineering.

The general part includes such important topics as isolation, identification, and characterization of DNA fragments (including chemical synthesis of DNA), ligation of DNA fragments, genomic libraries, identification of DNA fragments and directed mutagenesis. The special part (approximately 270 pages) deals with vector development and cloning in different organisms, e.g., *E. coli, B. subtilis, Streptomycetes,* yeasts, animals, humans and plants.

In the introduction, the main steps in cloning are described. This text, however, is so comprehensive, that figure 1-1 should include some more explanations for understanding the last steps, transformation and selection. In the last chapter "Safety in recombinant DNA research", such delicate questions as gene therapy and environmental applications are discussed. The appendix contains lists of restriction endonucleases, the DNA sequences of some vectors, λ genes, some *E. coli* strains, and guidelines for research involving recombinant DNA molecules.

This book commended in its approach to theoretical progress in molecular biology, and can be recommended to all who are interested in newly developed methods and techniques and their application at the industrial level.

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