

Organisation of the Cell Nucleus

FRONT COVER

An image of a polytene nucleus from *Drosophila* larvae salivary glands incubated in *Xenopus* egg extract: merged red (DNA stain) and green (sites of DNA replication) images. For details see article by Sleeman et al. (1992) *J. Cell Sci.* **101**, 509-515.

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Edited by

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**SUPPLEMENT 19 1995
JOURNAL OF CELL SCIENCE**

Published by THE COMPANY OF BIOLOGISTS LIMITED, Cambridge

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JOURNAL OF CELL SCIENCE (ISSN 0021-9533)

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Journal of Cell Science
Supplement 19
December 1995

Typeset, Printed and Published by
THE COMPANY OF BIOLOGISTS LIMITED
Bidder Building, 140 Cowley Road, Cambridge CB4 4DL, UK
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ISBN: 0 948601 44 2

Preface

The cell nucleus is a marvel of information management and retrieval. Two metres of DNA is packed into a human nucleus of just a few micrometers in diameter. A clearer perspective of this problem is seen by a scale model enlarged one million times. On this scale 2,000 kilometres of DNA, enough to reach from New York to Kansas City or London to Naples, is packed into a nucleus just six metres in diameter, the size of a large seminar room. In spite of this intense level of packaging, all regions of the DNA must remain accessible to be replicated and a specific part must remain accessible for transcription. Furthermore different parts must be transcribed in different types of cell. This volume considers how the cell nucleus functions. In particular it focuses on how the functions of the cell nucleus are precisely regulated.

The rate of progress in understanding how the nucleus functions has become breathtaking in recent years. Rapid progress has occurred in understanding nuclear structure and

how the architectural principles of nuclear structure contribute to its function. The protein machinery of DNA replication, transcription and processing is rapidly emerging, resulting from a combination of biochemical fractionation and molecular genetics, notably of lower eukaryotes such as yeast. However, a growing challenge arises in understanding how this molecular machinery is controlled to ensure that only a precise spectrum of messenger RNA molecules is delivered to the cytoplasm or that all DNA in the genome is replicated precisely once in each cycle. This volume attempts to capture and convey that excitement.

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