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THE BIOCHEMICAL JOURNAL

SYMPOSIA SERIES No. 42

BIOCHEMISTRY OF THE CELL NUCLEUS

Edited by **P. B. Garland** and **A. P. Mathias**
(ISBN 0 904498 03 4) £15.00 U.S. \$30.00

The articles of this Symposium deal with aspects of the structure and function of the cell nucleus, at several levels of molecular and biological organization. Although much is already known of the way in which the genetic information of eukaryotic cells is stored, replicated, transcribed and processed, the scale and intricacy of the operation is immense in comparison with the simpler and more amenable bacterial systems. Accordingly our knowledge of the more highly evolved eukaryotic systems is far from complete, both in concept and detail. The articles not only review present knowledge; no less importantly they identify areas where mystery is more obvious than mechanism, and they pose some of the central questions that future research will have to answer.

Biochemistry of the Cell Nucleus will be timely reading for those in life or medical sciences who, either by their teaching or research, or just general intellectual curiosity, desire to deepen their understanding of how the nucleus masterminds the incredibly complex but beautifully co-ordinated activities of the cell.

List of contents and authors:

Multiplicity of Animal Cell Deoxyribonucleic Acid Polymerases by **G. Brun & F. Chapeville.**

The Heterogeneity of Deoxyribonucleic Acid Polymerase- α by **A. M. Holmes, I. P. Hesselwood, R. G. Wickremasinghe & I. R. Johnston.**

Variation of Deoxyribonucleic Acid Polymerases in the Cell Cycle by **H. M. Keir, R. K. Craig & A. G. McLennan.**

The Deoxyribonucleic Acid Polymerases of Non-Vertebrate Eukaryotes by **A. G. McLennan & H. M. Keir.**

Eukaryotic Deoxyribonucleic Acid-Dependent Ribonucleic Acid Polymerases: A Critical Assessment of Current Ideas Concerning their Multiplicity, Specificity and Function and their Role in the Regulation of Gene Expression by **T. J. C. Beebee & P. H. W. Butterworth.**

An Approach to the Understanding of Messenger Ribonucleic Acid Synthesis, Processing and Regulation in Eukaryotes by **R. Williamson.**

Post-Synthetic Modifications of Nuclear Macromolecules by **S. Shall, P. Goodwin, H. Halldorsson, G. Khan, C. Skidmore & C. Tsopanakis.**

Chromatin Structure by **J. O. Thomas.**

Structure and Function of Nuclear Membranes by **W. W. Franke.**

Non-Histone Chromosomal Proteins: Their Role in the Regulation of Histone-Gene Expression by **G. S. Stein, J. L. Stein, L. J. Kleinsmith, R. L. Jansing, W. D. Park & J. A. Thomson.**

Inside 45S Ribonucleic Acid by **B. E. H. Maden, M. S. N. Khan, D. G. Hughes & J. P. Goddard.**

Injected Amphibian Oocytes: A Living Test Tube for the Study of Eukaryotic Gene Transcription? by **E. M. De Robertis, J. B. Gurdon, G. A. Partington & R. A. Laskey.**

Mitosis and Microtubule Assembly by **M. Jacobs & T. Cavalier-Smith.**

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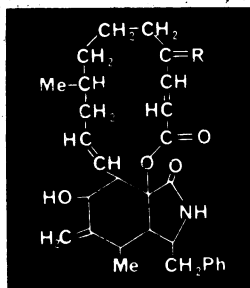
The Cytochalasins:

(Greek: *cytos*, cell; *chalsis*, relaxation)



Versatile Probes for Cytological Research

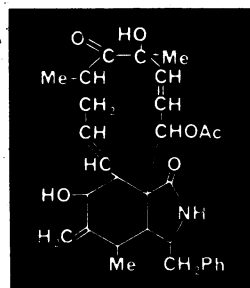
The **Cytochalasins** are a group of structurally related fungal metabolites discovered in 1964 in the laboratories of the Pharmaceuticals Division of Imperial Chemical Industries, Ltd. The **Cytochalasins** share a number of unusual, interesting and characteristic effects on the cell and are becoming increasingly important as research probes in cytology. To date, **Cytochalasin B** has been used in the vast majority of reported experiments.



CYTOCHALASIN A
R=O
CYTOCHALASIN B
R=H, OH

Major biological effects observed with the **Cytochalasins** include:

1. **Inhibition of the division of cytoplasm.** Total inhibition of cytoplasmic cleavage is obtained without interference with division of the nucleus resulting in binucleate cells. If cultured cells are allowed to remain in the active medium, nuclear division continues and large multinucleate cells are observed.

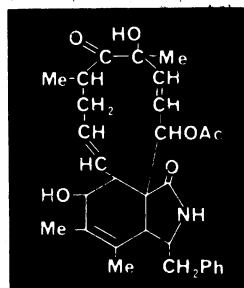


CYTOCHALASIN D

2. **Reversible inhibition of cell movement.** When moving L cells on a glass surface are treated with **Cytochalasin B**, peripheral and internal cell movements disappear, but are readily restored by washing the cells with normal medium. This effect is best observed by time-lapse cinematographic studies.

3. **Induction of nuclear extrusion.** In this very interesting phenomenon, it is remarkable that a cell can be induced to eject its nucleus entirely within minutes of treatment with a chemical compound. Most

noteworthy is the fact that **Cytochalasin E** rarely produces nuclear extrusion. However, it is unique in producing a "halo" around the nucleus.



CYTOCHALASIN C

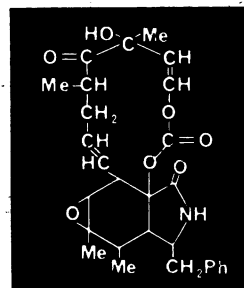
The **Cytochalasins** also exert inhibitory effects on the following biological processes: phagocytosis, platelet aggregation and clot retraction, glucose transport, thyroid secretion, and release of growth hormone.

Cytochalasin A has been shown to be a sulfhydryl-reactive agent, inhibiting growth and sugar uptake in *Saccharomyces* strain 1016.

The antibiotic and antitumor activities of **Cytochalasin D** have been reported.

Research continues to uncover new biological effects for these **Cytochalasins**. Space does not allow us to cite the several hundred references from the literature but a *data sheet and comprehensive bibliography are available free upon request.*

Cytochalasins A, B and E are manufactured in England by Imperial Chemical Industries, Ltd. and are distributed by Aldrich.



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