Meetings

Cellular Dynamics: The Cell Cycle

The chemistry of the cell cycle, the structure of the cell during mitosis, and the mechanism of mitosis were discussed at the 3rd Conference on Cellular Dynamics (Princeton, N.J., 7–10 February). This meeting, like others in the series, was designed to provide extended discussion in a particular area with emphasis on the definition of unsolved problems and the possible directions of future research rather than on the presentation of reports of current work.

The first session, led by S. Gelfant (University of Syracuse) and E. W. Taylor (University of Chicago), was concerned with synthesis of macromolecules and energy requirements for mitosis. The concept, originated by Swann, of an energy reservoir for mitosis was subjected to sharp criticism. The available evidence supports neither the need for a large amount of energy for mitosis nor the presence of specific pools of energy-yielding compounds which are segregated for use during mitosis. However, carbon monoxide blocks mitosis in sea-urchin eggs (Epel) when the concentration of adenosine triphosphate is less than 50 percent of the normal concentration. Presumably phosphagens are involved in the process, but their presence may be related to other mechanisms besides the mechanical-energy requirement.

The question of DNA replication and the asynchrony in labeling of chromosome segments during the synthetic period of interphase (S stage) was discussed by J. H. Taylor (Florida) and Prokofieva-Belgovskaya (Moscow). Statistical analysis of grain distribution over chromosome segments in radioautographs clearly showed a time sequence in duplication of different regions of the chromosome in human leukocytes (Prokofieva-Belgovskaya). Taylor emphasized the significance of asynchrony with respect to control of DNA duplication. It was suggested that chromosomes probably contain many regions that replicate as a unit ("a replicon") and which are controlled by specific genes.

Our almost complete ignorance of the timing of synthesis of enzymes and structural proteins such as those of the mitotic apparatus was emphasized. The relation of the control of protein synthesis in the cell cycle to the shutting off of the synthesis of several proteins during cellular differentiation was discussed by H. Holtzer (University of Pennsylvania). It was decided that this field is of great importance for future study and that concepts of repression derived from bacterial systems may not be sufficient to explain the inactivation of large blocks of genes.

A discussion of use of specific protein stains and ultraviolet fluorescence microscopy for the study of growth during the cell cycle was presented by Zelenin (Moscow).

The occurrence of fibrous structures and their relation to the mitotic spindle were discussed by L. E. Roth (Iowa), and a survey of the occurrence and structure of microtubules was presented by M. C. Ledbetter (Harvard). It is increasingly evident that the microtubule structures in the spindle can be correlated with structures associated with streaming in plants and possibly even with paired filaments in cilia and flagella.

A discussion of the general features of mitotic movements in relation to other motile systems (streaming, cilia and flagella, saltatory movements) was introduced by Wolpert (King's College, London). A general feeling arising from the dicussion was the need for a unified approach to problems of motility. The similarity in chemical properties of the proteins of the mitotic spindle, cilium, and slime mold was discussed by Gibbons (Harvard) and Rebhun (Princeton). The question was also raised as to whether all motile systems contain at least two protein components.

The mechanism of chromosome movements remains obscure. Although it was felt that theories which do not take account of the fibrous structure of the spindle can be safely abandoned, four or five mechanisms still remain which could explain the observations. The simple picture of elastic filaments no longer seems adequate, and the chromosome movements obtained after microbeam irradiation (Forer and Inoué) can hardly be explained by a one-component elastic mechanism.

The structure of the plasma membrane, the role of membrane formation, and changes in rigidity during cleavage formed part of a general discussion (Benedetti, Amsterdam; Selman, Edinburgh; Zimmerman, Toronto). A single mechanism of cleavage applicable to various types of eggs (frog and sea-urchin) and somatic cells cannot be agreed upon at present.

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Forthcoming Events

June

12–20. National **Speleological** Soc., annual conv., Bloomington, Ind. (D. R. Martin, 2711 Oak St., Terre Haute, Ind.)

13. Society for **Surgery of the Alimentary Tract**, New York, N.Y. (R. Turell, 25 E. 83 St., New York)

13–15. **Medicine and Religion**, 1st natl. symp., Estes Park, Colo. (Office of Postgraduate Medical Education, Univ. of Colorado Medical Center, 4200 Ninth Ave., Denver 80220)

13–17. American Inst. of **Chemical Engineers**/Institution of Chemical Engineers, joint meeting, London, England. (F. J. Van Antwerpen, American Inst. of Chemical Engineers, 345 E. 47 St., New York, N.Y. 10017)

13–18. American Soc. for **Testing and Materials**, 68th annual, Purdue Univ., Lafayette, Ind. (ASTM, 1916 Race St., Philadelphia, Pa. 19103)

14–16. Cooper **Ornithological** Soc., Univ. of British Columbia, Vancouver, Canada.