
The volume contains the papers presented at the 24th Meeting of the Society in July 1972. The subject was chosen fortunately. The cell cycle and its relation to phenomena of development is very much in the minds of developmental biologists, particularly since the operon concept introduced new vistas of gene regulation during early development – a kind of return to Weismann’s ‘erbungleiche Kernteilung’ (genetically unequal nuclear division).

The opening paper is by J. M. Mitchison, whose fine book ‘The Biology of the Cell Cycle’ is a major milestone in the field. Here he develops the idea of morphogenesis within the single cell. The symposium deliberately omitted papers on the cycle in protokaryotes (bacteria and viruses) and in synchronous populations of protozoa because they were so thoroughly examined recently. But there are several papers on other protozoa and proto-phyta (acellular eukaryotes, as the editors call them in their Preface): on combination of nuclei and cytoplasm of Amoebae from different stages of the cell cycle (Ord), on the cell cycle in micro- and macronuclei of Stylonychia in relation to function and differentiation (Ammermann), a somewhat similar study on a plant microorganism, Chlorella, connected with cell wall formation (John et al.), and a study on the plasmodial slime mold Physarum, which has a certain natural synchrony of the cycles of its nuclei (Grant).

There is a group of papers on the cell cycle in the development of higher plants, such as the pattern of mitosis in root meristems (Barlow), length of the phases of the cell cycle in the shoot tip in relation to development (Lyndon), and others. But the bulk of contributions concerns, naturally, cell cycles and early development in metazoa. The relationship between oogenesis and early development is the subject of two fine papers by Giudice (sea urchins) and by van den Biggelaar and Boon-Niermelier (molluscs). The latter point out that the length of the cell cycle and its timing are specific for the morpho-genetic fate and cytoplasmic origin of the blastomeres of the cleaving eggs of the snail Lymnaea. Two further papers analyze the radiation sensitivity (Hamilton) and temperature sensitivity (Chibon) of the different phases of the cell cycle in blastomeres and in larval tissue cells of amphibia. One paper concerns polyteny of cells in dipteran larvae, which is the result of shortened cell cycles (Rudkin) and another the cell cycles of the inner cell mass of mouse embryos (Graham). Thus, a good variety of the phyla of the animal kingdom are represented in these papers.

A final group of papers centers on the problem of extrinsic control of the cell cycle, especially erythropoiesis and lymphocyte activation. In this group the last paper of the volume (Rytomaa) is of particular interest to oncologists as it discusses the chalone theory of mitosis induction in connection with granulopoiesis under normal conditions (both in vitro and in vivo) and in neoplasia. Two papers in this group (by Hardy and Ling and by Harris and Olsen, respectively) point out the shortcomings of some existing views about mitotic stimulation and offer new suggestions.
The volume contains many valuable data and many stimulating ideas, even if they cannot be all brought together into a single coherent picture. This was, of course, not to be expected. But we must be grateful to the organizers of the symposium and the editors of the volume for providing in the cell cycle concept a kind of unifying platform on which the authors could present their data and views about a number of basic phenomena of morphogenesis and differentiation.

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The Ciba Symposium devoted to the problems of tissue cell locomotion on solid substratum forms the background of this volume. As the Chairman of the Symposium, M. Abercrombie points out in the introduction, until recently the subject was mainly the territory of protozoologists interested in the movements of amoeboid protozoa. Today large numbers of cytologists studying the mechanism of expansion of cell and tissue cultures, pathologists interested in movements of leukocytes, and in particular developmental biologists who turn more and more often to techniques of tissue culture when analyzing morphogenetic movements of embryos, concentrate their attention on the subject.

Altogether 14 papers were presented at the symposium and are published here in full, together with the discussions which took place after each paper and at two general discussion sessions. The emphasis was on the movements of tissue cells and on morphogenetic movements which still represent an enigma in developmental biology with their integration to produce supracellular organization.

The first seven papers of the volume (and the symposium) deal with the factors involved in cells movements in general, such as cell surface changes (Harris), fluidity of the plasma membrane (De Petris and Raff), microfilaments and microtubules (4 papers) and cell adhesion (Curtis and Buultjens). It will be a revelation to the less initiated to learn that the contractile proteins act in and myosin are found in many cell types not specifically noted for contractility. Both the general and the specific papers contain also data on inhibitors of cell movements, such as cytochalasin, antiserotonin and anticholinergic agents and their effects not only on movements in the strict sense but also on phenomena like micropinocytosis (endocytosis) and the discharge of secretory microvacuoles (exo-cytosis).

The specific papers deal with nerve cells (Dunn), epithelial cells (Middleton) and fibroblasts (Gail). The problems of morphogenetic movements are the subject of two fine papers on killyfish blastoderm cells (Trinkaus) and sea urchin gastrulae (Gustafsson). Oncologists will be particularly interested in a comparative study of the interaction of normal and malignant fibroblasts with their substratum (Vasiliev and Gelfand). The last paper (Steinberg) reexamines the problem of contact inhibition which was the subject of some controversy recently.

The papers, most of them by renowned expert in their field, are well produced, well illustrated and the volume is thoroughly indexed – a delight to read.

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