

MODERN RESEARCH METHODS IN HYSTOLOGY AND CYTOLOGY

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One section of the histology - cytology. Cytology is the science about of the structure of all normal and abnormal components of cells and the changes, movements, and transformations of such components. The discipline includes cytogenics, cytochemistry, and microscopic anatomy, which involve investigations employing various microscopes, such as light, phase, interference, and electron microscopes. Cells are studied directly in living state (phase microscopy) or are killed (fixed) and prepared for viewing (embedded, sectioned, and stained) on light or electron microscopes. The birth of the modern era of cytology dates to the 1950's. The advent of new research techniques and the advances made in related branches of science stimulated the rapid development of cytology and led to a blurring of the boundaries between cytology, biochemistry, biophysics, and molecular biology.

The principal goals of modern cytology include the continued study of microscopic and submicroscopic cell structures, the chemical organization of cells, the functions of cell structures and their interactions, the ways in which substances penetrate into cells and may be isolated from cells and the role of membranes in these processes, the reactions of cells to neural and humoral stimuli of the macroorganism and to stimuli from the surrounding medium, the perception and conduction of excitation, the interaction between cells, the reactions of cells to injury, and the repair of injuries and the adaptation of cells to environmental factors and injurious agents. Cytology is also conducting further research in the reproduction of cells and cell structures, the transformation of cells in the course of morphophysiological specialization (differentiation), the nuclear and cytoplasmic genetic apparatus of the cells and of changes therein that cause hereditary diseases. In addition to the theoretical aspects, cytology is also working toward a solution of several very important biological, medical, and agricultural problems.

A number of branches of cytology have emerged, depending on the objects being studied and the methods of study used; they include cytogenetics, karyosystematics, cytoecology, radiation cytology, oncological cytology, and immunocytology. The most common uses of microarrays cytogenetics methods are for early diagnosis of congenital diseases. The use of microarrays in cancer research and diagnosis has been adopted too.

Methods cytochemistry and tsitogeneriki intensively developed. They are widely used in experimental and clinical pharmacology, in practice medicine.