Isenberg, G. (ed.): **Modern Optics, Electronics, and High Precision Techniques in Cell Biology.** - Springer, Berlin - Heidelberg - New York - London - Paris - Tokyo - Hong Kong 1998. 261 pp. DM 248.00, USD 169.00. ISBN 3-540-62673-5.

The aim of the book is to present new techniques used in cell and molecular biology based on optical, physical and related principles. Most of the presented methods enable to study the cells and molecular systems in the functional state and in real time. New and perspective methods presented are mostly of microscopic optical nature and related methods (time-resolved imaging, fast kinetics of biological reactions, neutron reflection, rheological properties, *etc.*).

The book comprises 11 chapters written by renowned specialists in the respective fields. In each chapter the basic principles are given, sample preparation and handling outlined and a series of examples presented. A necessary physical or mathematical background is given. A list of contents and usually a rather rich and up-to date list of references is included in each chapter together with the address of the corresponding author. There are many figures and schemes illustrating the subject. Some of the microscopic figures are produced in color. The book is supplemented with the Subject Index.

The first chapter is devoted to atomic force microscopy (AFM), the second chapter to the confocal laser scanning microscopy. Chapter 3 deals with infrared videomicroscopy. The application of this microscopic technique is concentrated on visualization of neurons, their development, death and to the spread of excitation along neurons. The application of the time resolved imaging in neurophysiology is demonstrated in chapter 4. An adapted optical microscope can be used for optical (laser) micromanipulation of macromolecules. An application of optical tweezers to microtubules is shown in chapter 5. The video-enhanced fluorescence microscopy is used to follow the dynamics of filamentous protein networks (mostly F-actin) in chapter 6. Chapter 7 describes the neutron reflection methods used mostly for studies of lipid membranes and their interfacial structures and for the interaction of lipids and proteins. Optics is presented in detection system of stopped flow method described for the case of fast reactions in chapter 8. The examples are from the field of cytoskeletal protein-protein interactions. Chapter 9 deals with a very young technology - biomolecular interaction analysis (BIA-technology). The method enables to monitor the molecular interactions in real time. The technology is based on biosensor principle and relies on the surface plasmon resonance (SPR) at the sensor surface. Chapter 10 describes the method of micromachining and the application of the produced microsensors in studies of cell motilities and sub-cellular traction forces.

The last, most extensive chapter deals with viscoelasticity, rheology and molecular conformation dynamics. Basic rheological molecular quantities are defined (*e.g.* bending elastic modules), the principles of viscoelasticity explained together with the theoretical descriptions and model introduction. The main rheological techniques are shown. A practical application of these techniques is shown for the case of actin polymerization, actin-troponin interactions or actin networks.

The book should be of interest for biophysicists, cell and molecular biologists and to all who want to understand new and promising physical methods used in biology. The book may be recommended also for advanced courses of biological research methods for undergraduate and graduate students. Although the presented applications are mostly from the biomedical region (neurons, actin, *etc.*) the methods might be expected to find soon an application also in plant biology.

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