

PREFACE

Individual cells behave in surprising ways that cannot be deduced from the averaged results of an organ as assessed by the use of conventional biochemical methods. Thus multicellular plant and animals systems are being investigated by an increasing array of histochemical and cytochemical techniques based on general chemical or specific immunological interactions to identify structural materials and to assess biological activities.

In recent years there has been an increasing range of fluorescent probes, along with advanced computerised imaging and analysis techniques, which allows the behaviour of individual living cells to be followed in considerable detail. The parallel use of microinjection, microelectrodes and patch-clamping provides additional information about cells and their responses. Recombinant DNA technology has highlighted the desirability and the power of microinjecting defined materials into specific cells and so manipulating their fundamental biochemistry. New hypotheses are being tested which will form the cornerstone of future developments across the whole spectrum of biotechnology.

The *First European Workshop on Biotechnology Applications of Microinjection, Microscopic Imaging and Fluorescence* was run at the University of East London, U.K., 21st-24th April, 1992 with the objective of bringing together a diverse group of individuals who were using these state-of-the-art applications for biotechnological exploration. A novel feature of the meeting was participation by instrument manufacturers in the programme: there were hands-on workshops (where living cells could be examined), combined with the poster sessions.

This meeting attracted cell biologists of all persuasions, instrument scientists, physical chemists and information scientists who shared an interest in a series of new concepts. These included correlating the physicochemical properties of fluorescent probe molecules with their distribution in cells; the use of synthetic fluorescent lipid molecules to study lipid dynamics; the exploitation of the fluorescence of natural molecules; the full range of microinjection and patch-clamping applications to turn "the living cell into a test-tube" and investigate signal transduction, intracellular communication and development; all aspects of microscopic imaging and its applications in physiology, pharmacology and toxicology, especially using confocal laser scanning microscopy to facilitate determination of the three-dimensional distribution of fluorescence. Other topics included flow cytometry, neuronal organisation in the human brain, single-cell laser microsurgery, chromatin folding and low-light-intensity imaging and image analysis.

Many of the techniques are sophisticated, and much of the equipment is expensive; thus research based on these powerful techniques can best be advanced by laboratory exchanges, something that can now take place in Europe under a number of European Commission programmes.

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