

## BOOK REVIEWS

### **Surfaces of Normal and Malignant Cells**

R. O. HYNES, EDITOR

*Wiley, New York, 1979, 471 pp., \$92.00*

The editor of this book is faced with a formidable task; that is, in one text to try to bring together from various disciplines the present state-of-the-art regarding biochemical, biophysical, and immunological aspects of normal and malignant cell surfaces. In the process, much that is relevant to a current discussion of cell surfaces has been left out and quite a bit of irrelevant information has been included.

The development of the central thesis—on the nature of the normal cell surface, how it differs from the malignant surface, and how one goes about studying it—starts off on the right track. The first chapter deals with an introduction into the concepts of tumorigenicity, transformation, and cell surfaces, and describes the techniques used to study these phenomena, with cell culture obviously being the major tool used in deriving the homogeneous populations of cells needed to conduct biochemical comparisons of malignant and normal cell membranes. The second chapter is a classical descriptive discussion of differences in the morphology of normal and malignant cells.

The succeeding five chapters approach the cell membrane from the point of view of differences in isolated components in normal and malignant cells, including glycolipids, proteins and glycoproteins, mucopolysaccharides, membrane enzymes, and proteolytic enzymes. These chapters range in quality from an insightful evaluation of the molecular nature of these components, complete with synopses inserted at various checkpoints to summarize information presented and hold the reader's interest, to chapters that are just plain confusing. The latter generally are nothing more than a recitation of experiment after experiment, most of which are conflicting in the results obtained. In those chapters, no attempt is made to summarize the vast body of information presented nor are any conclusions offered. Inclusion of a few tables or graphs in those chapters, rather than just descriptive statements, would help enormously in orienting the reader. All chapters in this section do, however, contain excellent bibliographies.

The latter third of this text deals with a variety of topics, some of which are relevant to the central thesis, most of which are not. The chapter on Early Events in Growth Stimulation deals with various exogenous factors involved in cell growth

and changes in transport of certain essential compounds into the cell. Although transport is a topic intimately concerned with membranes, the author discusses these phenomena from the point of view of changes in the intracellular environment, with hardly a mention of the membrane *per se*. The chapter on Immune Response to C-type Virus-Induced Particles is nothing more than an attempt to include something on the antigenic nature of cell surfaces in this book. The immunology of cell surfaces is a topic worthy of a text in its own, and it would have been better to leave this chapter out than to present a smattering of information on an area as defined as viral induced changes. In order to be current, any discussion of the antigenic nature of tumor cells must include a major discussion on the use of monoclonal antibodies to identify unique cell surface determinants. No such discussion is presented here. The chapters on Surface Components of Erythrocytes and Their Role in Transport and the Adhesive Specificity of Embryonic Cells are excellent. Both are concise and selective in scope. The final chapter on the biochemistry of slime mold plasma membranes is totally irrelevant.

Noticeably missing from this text is any detailed discussion of the use of physical techniques such as ESR, NMR, or photobleaching recovery to probe the membrane surface. Also missing are discussions on the use of monoclonal antibodies and any information concerning studies of the synthesis and insertion of proteins into membrane bilayers. Although there are several excellent reference chapters in this book, recent developments in the fields of immuno- and physical biochemistry make this text somewhat less than current.

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## **Structure and Bonding. Vol. 41. Molecular Structure and Sensory Physiology**

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*Springer Verlag, New York, 1980, 146 pp., \$39.00*

Physiological responses to a light stimulus are a fascinating area of investigation whose botanical origins began in 1817 when Treviranus reported on the accumulation of green algae in a shaded as opposed to illuminated sector. Studies of phototropism also encompass phenomena such as light-stimulated curvature of plant cotyledons and bending of fungal sporangiophores toward the illumination. This collection of review articles by notable authorities deals with bringing a more than century-old phenomenon into the age of molecular biochemistry. Upon reading this work one is immediately struck by the lack of detailed biochemical informa-

tion regarding phototropism. Apparently this results from the complexity of events that must occur within an organism before a response can be measured and that cannot currently be isolated as a simplified *in vitro* reaction. It is not surprising then that most of the collective evidence is restricted to observations using whole organisms. As such the main threads consist of attempts to define semantically the responses in question or spectrally identify the photosensitizing chromophores. The former problem, though interesting from a historical perspective, is only tangentially relevant to molecular biochemistry and would seem more appropriate in a physiological or behavioral review. The spectral information is more relevant and adequately covered. Each review of the action spectra for the different phototropic cases points toward either carotenoids or flavin-like substances as the most promising candidates, with the evidence more decidedly in favor of flavins.

If this were the only information provided, this review would fall far short of a molecular orientation. Fortunately, there are a few bright spots, notably in the first chapter on "Physiological Bluelight Reception." In addition to a general review of spectrophotometric studies, the chemical and physical properties of flavins are discussed in some detail. This information is further integrated with a balanced discussion of attempts to isolate membrane fractions containing electron carriers (e.g., cytochrome b), which might be involved in the conversion of light into an intracellular chemical or electrical stimulus. The middle two chapters on photoresponses of flagellated algae and phycomyces, respectively, are more descriptive in nature, while the final chapter returns to a more elemental approach to underlying chemical or electrical causes.

Interested parties should find this book a more than adequate review of current information. However, those desiring a comprehensive molecular explanation will not find one; they would be better advised to follow-up experimentally some of the biochemical leads indicated.

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## **Enzyme Engineering, Vol. 5**

HOWARD H. WEETALL AND GARFIELD P. ROYER, EDS.

*Plenum, New York, 1981, 485 pp., \$49.50*

This 500 page volume is the result of the latest meeting of the Enzyme Engineering group, which is always a lively and broadly based affair. However, the fact that every submitted paper from the 183 participants has been published automatically means that no individual has had the opportunity to describe his work in depth. The book is already over one year old which might make one think that the contribu-

tions are no longer timely. However, this is not the case. Many of the articles describe interesting new ideas which are worth reading. The Keynote lecture delivered by Katchalski Katzir is well worth reading in its own right as a wistful and far-sighted review of the predicted developments in enzyme engineering and stands alone in the detail that it provides.

Section I is a collection of papers on enzyme production. There is a notable lack of affinity chromatography papers, but the few that are presented are exciting. The development of immobilized tannin as a protein adsorbent breaks new ground. The second section on enzymes and energy transduction contains interesting articles on enzyme transistors, "even more" immobilized nucleotides, and some elegant approaches to the stabilization of hydrogenases. However, in the latter context, much of the work on hydrogenases will have to compete with Montedison's recent announcement of the development of a titanium dioxide catalyst that is capable of breaking down water, in sunlight, into oxygen and hydrogen on a scale suitable for commercial exploitation.

The fourth section concerns the applications, biomedical and analytical, of enzymes and antibodies. This section includes interesting articles on enzyme channelling immunoassay, lectin, glucose and lipid electrodes, and other applications of immobilized enzymes.

Section five is devoted to the large-scale applications of immobilized enzymes. The pilot-scale experience described for lactose hydrolysis is encouraging, as is the process described for the production of nucleotides (NADP) using immobilized cells.

Section six collects twelve papers on immobilized cells. The applications are mainly based on polyacrylamide and alginates as immobilization media and span a wide variety of cells and their uses.

Section seven contains fourteen papers on immobilized enzymes and their uses in the synthesis of fine chemicals and pharmaceuticals. In contrast to section six, these applications use an extensive variety of inorganic and synthetic polymers as carrier matrices.

In summary, a useful book for the nonspecialist.

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## **Affinity Chromatography**

### **Bioselective Absorption on Inert Matrices**

WILLIAM H. SCOUTEN

*Wiley, New York, 1981, 348 pp., \$42.50*

The book by William Scouten is volume 59 in a series of monographs on Analytical Chemistry and its Application, edited by P. J. Elving and J. D. Winefordner. This book is the most recent addition to the four books and three symposium proceedings already published over the past seven years in the general field of affinity chromatography.

One feature of books on a specialized aspect of biotechnology is that they tend to be collections of experimental designs and unending listings of examples, and this book is no exception. However, the eleven chapters of this book represent a well-balanced presentation of the state-of-the-art. The chapter on DNA-RNA affinity chromatography appears to be an excellent review of a topic that is not very well covered in other published books on affinity chromatography. One whole chapter has been assigned to the actual chemical recipes for the activation and coupling procedures currently in use. The rest of the book covers as diverse and important aspects of immobilized ligand technology as general ligand and covalent affinity chromatography, bioselective elution, quantitative approaches to bioselective adsorption, and hydrophobic interactions. The last chapter consists of miscellaneous applications, including affinity electrophoresis, purification of intact cells, and solid-phase radioimmunoassays. A detailed subject index is bound to be very helpful to the readers. Isolation of hormone receptors, a rather important and specialized application of affinity chromatography, is omitted by the author.

In spite of a relatively large number of typographical errors, the book is very well written, with clarity and simplicity. This book by Scouten is a general introductory book for the beginners in the field of affinity chromatography, as well as a limited reference book for the more advanced researcher.

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