EXPERIENCES IN BIOCHEMICAL PERCEPTION

Edited by

L. Nicholas Ornston

Stephen G. Sligar

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Preface

This volume honors I. C. Gunsalus, a gifted and versatile biochemist. The breadth of his contributions is reflected in the papers included in this work in which authors trace scientific insights they have gained as a result of their interreactions with Gunny.

Evident throughout this volume is Gunny's insistence on mastery of the technique most applicable to the problem at hand. Our knowledge is poor when compared with the wealth of the unknown, and, in seeking understanding, we are well advised to take whatever is available. Thus, genetics, enzymology, microbiology, chemistry, and spectroscopy combine to form the following narratives.

Gunny typically examined seemingly simple processes and followed them through to novel conclusions that swiftly became textbook generalizations. This volume begins with a description of metabolic processes as Ochoa and O'Kane describe the study of pyruvate oxidation. Umbreit then illustrates how studies of microbial respiration led to the discovery of pyridoxal phosphate, and Sokatch reviews dehydrogenases that participate in the dissimilation of branched-chain aromatic acids. Stanier communicates the flavor of correspondence with Gunny in a review of early discoveries in the mandelate pathway.

Outgrowths of Gunny's interest in metabolism are then presented in reviews by Dagley, Trudgill, and Marshall. Hartline and Toscano present a unified description of fatty acid and electron transport in *Pseudomonas*. The nutritional diversity of these organisms raised questions about their genetic organization, and these topics are addressed by Holloway, Chakrabarty, and Ornston. As described by Crawford, the genetic investigation of tryptophan biosynthesis in *Pseudomonas* has revealed novel regulatory mechanisms.

Wood and his associates introduce a section on regulation with a description of control of L-threonine dehydrase. Grunberg-Manago describes genes associated with the translation of messenger RNA; Jacobson and Jen-Jacobson present

evidence for posttranscriptional control of protein synthesis. A description of protein kinases by Kuo follows, and Smith gives an account of the phosphorus–nitrogen bond in phosphorylated proteins. Stadtman and his associates show that the inactivation of glutamine synthetase is in part mediated by cytochrome P450.

Studies of cytochrome P450 have correlated protein structure with electron transport. Sligar gives a description of life in the Gunsalus laboratory during the P450 years. Katagiri and Suhara describe adrenal cytochrome P450 molecules, while Dus reviews the binding of substrates to cytochrome P450. The function of another electron-transport protein, NADH peroxidase, is described by Dolin. Douzou describes the use of low temperature techniques to explore the mechanism of cytochrome P450. Debrunner and Frauenfelder relate the mechanism of electron transport to protein structure and document the interface between the Gunsalus laboratory and the physicists.

The volume concludes with two microbiological reviews: Lichstein describes elucidation of the function of the coenzyme biotin and generalizes about the use of bacteria in nutritional studies, while Campbell (Gunny's first graduate student) comments on discoveries that have been made with *Pseudomonas*, a favorite subject of Gunny's research.

Fresh perspective brings new knowledge, and the articles in this volume enrich one another. As would be expected in a volume honoring Gunny, the contributions bring insight into biochemistry past, passing, and to come.

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