

# **NOVA ACTA LEOPOLDINA**

**Abhandlungen der Deutschen Akademie der Naturforscher Leopoldina**

Im Auftrage des Präsidiums herausgegeben von

**JOACHIM-HERMANN SCHARF**

Director Ephemeridum der Akademie

---

**NEUE FOLGE**

**NUMMER 269**

**BAND 61**

---

## **Leopoldina-Symposium**

### **Functional and Regulatory Aspects of Enzyme Action**

**May 25 to 28, 1988  
in Halle (Saale)**

**Organized and edited by:**

**Ernst J. M. HELMREICH (Würzburg)**  
Mitglied der Akademie

**Helmut HOLZER (Freiburg)**  
Mitglied der Akademie

**Alfred SCHELLENBERGER (Halle)**  
Mitglied des Senates der Akademie

**With 148 Figures and 37 Tables**



**Deutsche Akademie der Naturforscher Leopoldina. Halle (Saale) 1989**

**EXHIBIT 1193 Jefferson Foote, Ph.D.**

Redaktion: Prof.Dr.med.Dr.rer.nat.Dr.h.c. Joachim-Hermann SCHARF als  
Director Ephemeridum,  
Prof.Dr.sc.nat. Alfred SCHELLENBERGER und  
Dipl.-Phys. Rainer-M. JACOBI,  
wissensch. Assistent der Akademie

Die Zeitschrift erscheint im Kommissionsverlag Johann Ambrosius Barth,  
DDR-7010 Leipzig, Postschließfach 109, Ruf 70131.  
Jedes Heft ist einzeln käuflich!

---

Lizenzträger: Deutsche Akademie der Naturforscher Leopoldina, Halle (Saale)  
Chefredakteur und Herausgeber: Prof.Dr.Dr.Dr.h.c. J.-H. SCHARF,  
DDR-4010 Halle (Saale), Postschließfach 302

Veröffentlicht unter der Lizenznummer 1393 des Presseamtes beim Vorsitzenden des Ministerrates der DDR  
Printed in the German Democratic Republic  
Gesamtherstellung: Druckhaus "Freiheit", Halle (Saale), BT Merseburg

## CONTENTS

Preface	9
Chapter 1: Enzyme Catalysis - Basic Principles	
SCHOWEN, R.L.: Transition-state Structure and Its Role in Enzyme Catalysis and Enzyme Regulation	13
HUBER, R.: Flexibility and Rigidity in Proteins and Protein Pigment Complexes	31
FISCHER, G.: Slow Conformational Changes and Their Enzymology	35
Chapter 2: Enzyme Catalysis - Theoretical Aspects	
BLUNDELL, T.L.: The Three-dimensional Structures of Aspartic Proteinases and Their Inhibitors - Lessons for Drug Design	57
KELETI, T.: Kinetic Power, a Key Parameter of Metabolic Control in Homogeneous and Heterogeneous Systems	59
HESS, B., MARKUS, M., MÖLLER, S.C., and PLESSER, T.: Nonlinear Dynamics in Chemistry and Biology	79
FOOTE, J.: Humanized Antibodies	103
Chapter 3: Enzyme Catalysis - Special Mechanisms	
THAUER, R.K.: Structure and Function of Methyl-CoM Reductase, a Nickel-Porphinoid Containing Enzyme in Methanogenic Archaeabacteria	113
CHRISTEN, P., GEHRING, H., KOCHHAR, S., TOBLER, H.P., MEHTA, P., and HALE, T.: Enzymic Vitamin B <sub>6</sub> -Catalysis: Mechanistic and Evolutionary Aspects	123

PALM, D., and SCHINZEL, R.: The Mechanism of $\alpha$ -Glucan Phosphorylases Studied by Substrate Analogs and Site-directed Mutagenesis	143
Chapter 4: Enzyme Catalysis and Regulation - Role of Domain Structure and Subunit Interactions	
NAGRADOVA, N.K.: Functional Aspects of Protein-Protein Interactions in Oligomeric Enzymes. NAD <sup>+</sup> -dependent Dehydrogenases	169
KLEINKAUF, H., and v. DÖHREN, H.: Interacting Multienzymes	189
LANE, A.N., STRASSER, A., and KIRSCHNER, K.: Catalysis of Coupled Reactions. Communication Between the Two Active Sites of Tryptophane Synthase	209
Chapter 5: Enzyme Regulation - Functional and Kinetic Aspects	
SCHACHMAN, H.K.: Effects of Amino Acid Substitutions on the Catalytic and Regulatory Properties of <u>E.Coli</u> Aspartate Transcarbamylase (ATCase)	213
HERVÉ, G.: Mechanism of Allosteric Heterotropic Interactions in <u>Escherichia Coli</u> Aspartate Transcarbamylase	217
SCHELENBERGER, A., HÜBNER, G., KÖNIG, S., FLATAU, S., and NEEF, H.: Substrate Activation of Pyruvate Decarboxylase - Mechanistic Aspects	225
HÜBNER, G., and WOLNA, P.: Oscillations in Regulatory Enzyme Systems at Constant Substrate Input	243
Chapter 6: Enzyme Regulation - Special Systems	
HOLZER, H.: Regulatory Protein Phosphorylation in Yeast	253
HOFMANN, E., KRETSCHMER, M., FRENZEL, J., and SCHELENBERGER, W.: Regulation of the Fructose 6-Phosphate/Fructose 2,6-Biphosphate Cycle	269
HEKMAN, M., PFEUFFER, T., and HELMREICH, E.J.M.: Protein-Protein Interactions in Hormonal Signal Transmission	289

WALTER, U., BÖHLER, W., MEINECKE, M., NIEBERDING, M., WALDMANN, R., and LOHMANN, S.M.: Second Messenger-regulated Protein Kinases and Their Role in Hepatocyte and Platelet Function	311
SEVERIN, E.S., and ALAKHOV, V.Yu.: Role of $\text{Ca}^{2+}$ and cAMP in the Regulation of Intracellular Systems	329
 Chapter 7: Protein Turnover and Intracellular Proteolysis	
LEVINE, R.L., RIVETT, A.J., and CERVERA, J.: Oxidative Modifica- tion of Proteins: Potential Physiologic and Pathologic Roles	355
SWITZER, R.L.: Regulation of Selective Intracellular Proteolysis in <i>Bacillus subtilis</i>	367
KATUNUMA, N., and KOMINAMI, E.: Mechanisms and Regulation of Protein Degradation in Lysosome	369
 Chapter 8: Enzymes - Intracellular Traffic	
BLOEHL, G.: Intracellular Protein Topogenesis	385
RAPOPORT, T.A., WIEDMANN, M., KURZHALIA, T.V., and HARTMANN, E.: Signal Recognition in Protein Translocation Across the Endo- plasmic Reticulum Membrane	399
VESTWEBER, D., and SCHATZ, G.: Blockage and Quantification of Mitochondrial Protein Import Sites by an Internally Cross- linked Hybrid Precursor Protein	409

# Explore Litigation Insights



Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

### API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

### LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

### FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

### E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.