



# ANNUAL REVIEW OF BIOPHYSICS AND BIOMOLECULAR STRUCTURE

VOLUME 28, 1999

---

ROBERT M. STROUD, *Editor*  
University of California, San Francisco

WILMA K. OLSON, *Associate Editor*  
Rutgers, The State University of New Jersey

MICHAEL P. SHEETZ, *Associate Editor*  
Duke University, Durham



## CONTENTS

### STRUCTURAL PRINCIPLES

- RNA Folds: Insights From Recent Crystal Structures,  
*Adrian R. Ferré-D'Amaré and Jennifer Doudna* 57
- Structure and Conformation of Complex Carbohydrates of  
Glycoproteins, Glycolipids, and Bacterial Polysaccharides,  
*C. Allen Bush, Manuel Martin-Pastor, and Anne Imberty* 269
- Membrane Protein Folding and Stability: Physical Principles,  
*Stephen H. White and William C. Wimley* 319

### STRUCTURE AND FUNCTION

- Multiprotein-DNA Complexes in Transcriptional Regulation,  
*Cynthia Wolberger* 29
- DNA Repair Mechanisms for the Recognition and Removal of  
Damaged DNA Bases, *Clifford D. Mol, Sudip S. Parikh,*  
*Christopher D. Putnam, Terence P. Lo, and John A. Tainer* 101
- The Lysosomal Cysteine Proteases, *Mary E. McGrath* 181
- Rotational Coupling in the  $F_0F_1$  ATP Synthase, *Robert K.*  
*Nakamoto, Christian J. Ketchum, and Marwan K. Al-Shawi* 205
- The Proteasome, *Matthias Bochtler, Lars Ditzel, Michael Groll,*  
*Claudia Hartmann, and Robert Huber* 295
- Closing in on Bacteriorhodopsin: Progress in Understanding the  
Molecule, *Ulrich Haupts, Jörg Tittor, and Dieter Oesterhelt* 367

### DYNAMICS

- Nitroxide Spin-Spin Interactions: Applications to Protein Structure  
and Dynamics, *Eric J. Hustedt and Albert H. Beth* 129
- Molecular Dynamics Simulations of Biomolecules: Long-Range  
Electrostatic Effects, *Celeste Sagui and Thomas A. Darden* 155

EMERGING TECHNIQUES

Raman Spectroscopy of Protein and Nucleic Acid Assemblies, <i>George J. Thomas, Jr.</i>	1
Modern Applications of Analytical Ultracentrifugation, <i>T. M. Laue and W. F. Stafford, III</i>	75
Solid-State Nuclear Magnetic Resonance Investigation of Protein and Polypeptide Structure, <i>Riqiang Fu and Timothy A. Cross</i>	235

INDEXES

Subject Index	401
Cumulative Index of Contributing Authors, Volumes 24–28	417
Cumulative Index of Chapter Titles, Volumes 24–28	419