

A comprehensive review of the field of sporulation research

REGULATION OF PROCARYOTIC DEVELOPMENT

Structural and Functional Analysis of Bacterial Sporulation and Germination

Edited by **Issar Smith**, *Public Health Research Institute, New York, N.Y.*,
Ralph A. Slepecky, *Syracuse University, Syracuse, N.Y.*, and
Peter Setlow, *University of Connecticut Health Center, Farmington*

The process of differentiation, by which a cell of one type gives rise to cells with a different morphology, physiology, and function, raises some of the most important questions in modern biology. This book presents an up-to-date review of current research on differentiation in procaryotes, especially in *Bacillus* and *Streptomyces* species, of which sporulation is the best studied example of this process. Other phenomena, i.e., the production of extracellular enzymes, antibiotics, and other secondary metabolites such as anti-insect spore crystals, all of which are of commercial importance, are reviewed. Thus, a nearly comprehensive picture of this spore field is given. Authors with specific expertise in the areas covered were chosen so that the emphasis would be on aspects not yet covered in detail or about which another viewpoint might be useful.

Microbiologists, biotechnologists, scientists in the food and pharmaceutical industries, molecular biologists, and workers interested in cellular differentiation will greatly benefit from this book, arising from the Tenth International Spores Conference, March 1988.

CONTENTS

1. Revised Genetic Map of *Bacillus subtilis* 168 (Pigot)
2. Spore Thermoresistance Mechanisms (Gerhardt and Marquis)
3. Genetic Manipulation, Cloning, and Functional Analysis of Sporulation Genes in *B. subtilis* (Youngman et al.)
4. Trigger Mechanism of Bacterial Spore Germination (Foster and Johnstone)
5. Metabolic Regulation of Sporulation and Other Stationary-Phase Phenomena (Sonenshein)
6. Subtilisin: a Redundantly Temporally Regulated Gene? (Valle and Ferrari)
7. Competence Regulon of *B. subtilis* (Dubnau)
8. Sigma Factors and Regulation of Transcription (Moran)

9. Initiation of Sporulation (Smith)
10. Forespore-Specific Genes of *B. subtilis* (Setlow)
11. Dependence Pathways for the Expression of Genes Involved in Endospore Formation in *B. subtilis* (Losick and Kroos)
12. Temporal and Spatial Control of Gene Expression during Sporulation (Stragier)
13. Role, Structure, and Molecular Organization of the Genes Coding for the Parasporal Delta Endotoxins of *B. thuringiensis* (Lereclus et al.)
14. Sporulation in *Streptomyces* spp. (Chater)

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Phosphate Metabolism and Cellular Regulation in Microorganisms

Editors: **Annamaria Torriani-Gorini**, *Massachusetts Institute of Technology, Cambridge, MA*; **Frank G. Rothman**, *Brown University, Providence, RI*; **Simon Silver**, *University of Illinois College of Medicine, Chicago, IL*; **Andrew Wright**, *Tufts University Medical School, Boston, MA*; and **Ezra Yagil**, *Tel Aviv University, Tel Aviv, Israel*

This important new volume presents the latest progress on DNA sequencing and analysis of phosphate transport systems, the Pho regulon and other regulons governing "global metabolism" in the cell, polyphosphates and their synthesis and degradation, and the export of proteins across the cell membrane. *Phosphate Metabolism and Cellular Regulation in Microorganisms* will be of interest to anyone investigating bacterial metabolism and molecular biology; it will also be of general interest to those with environmental concerns and interests in phosphate metabolism in higher organisms, both plants and animals. The work contains the proceedings of an international symposium held in Concarneau, France, June 1986.

CONDENSED CONTENTS

- I. Phosphate Regulation in *Escherichia coli* (5 chapters)
Pho regulon, alkaline phosphatase gene, PhoE protein, acid phosphatase
- II. Phosphate Regulation in Diverse Organisms (4 chapters)
Bacillus licheniformis, *Saccharomyces cerevisiae*
- III. Protein Secretion and Use of Alkaline Phosphatase (7 chapters)
E. coli: phosphate-binding-protein synthesis/export, phospholipids, foreign-protein secretion, *lamB* protein; alkaline phosphatase uses
- IV. Structure and Function of Alkaline Phosphatase (4 chapters)
Site-directed mutagenesis, crystal structure, multinuclear NMR analysis, *E. coli* isozyme
- V. Transport of Phosphate and Phosphorylated Compounds in *Escherichia coli* (7 chapters)
Pst system, Pit system, PhoE protein, glycerol 3-phosphate transport
- VI. Mechanisms and Energetics of Phosphate Transport in Other Organisms (4 chapters)
Pseudomonas aeruginosa outer membrane protein, sugar phosphate transport/anion exchange, solute/ion transport, *S. cerevisiae* phosphate uptake

- VII. Phosphate Reserves and Energy Storage: polyphosphates (5 chapters)
E. coli accumulation/metabolism, *Acinetobacter lwoffi* surface pool, *Propionibacterium shermanii* polyphosphate kinase and glucokinase, biosynthesis and transport in yeasts
- VIII. Phosphate Reserves and Energy Storage: Pyrophosphates (4 chapters)
NMR methanogen studies, inorganic pyrophosphate-supplied metabolic energy, *Rhodospirillum rubrum* energy conversion, pyrophosphate metabolism in plants
- IX. Global Regulatory Systems in Enteric Bacteria (6 chapters)
Carbon metabolism, nitrogen assimilation, stable-RNA transcription initiation, phosphorylated metabolites/alarmones, *E. coli* DNA damage/stress responses
- X. Historical Perspective: *E. coli* alkaline phosphatase gene-protein relationships
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Edited by **Douglas E. Berg**, *Washington University School of Medicine, St. Louis, Missouri*, and **Martha M. Howe**, *University of Tennessee, Memphis*

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EDITORS: **Ronald L. Crawford
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Proceedings of the 4th International Symposium

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MICROBIAL MATS

Physiological Ecology of Benthic Microbial Communities



Editors: **YEHUDA COHEN**, *Interuniversity Institute of Eilat, Eilat, and*
EUGENE ROSENBERG, *Tel Aviv University, Ramat Aviv, Israel*

Microbial mats are probably the oldest form of life on earth as witnessed in the fossil record. They are common in a large spectrum of environments and play a key role in elemental transformations. Microbial mats pose interesting evolutionary questions now being addressed through comparative physiology and analysis of molecular structure, and benthic microbial mats provide fascinating ecosystems for the study of microbial adhesion, growth and development at interfaces, cell-to-cell interactions, and metabolic interlock among closely interacting microbial communities.

This book focuses on microbial processes in microbial mats and their interaction with the environment of deposition. It is based on an international conference held in Eilat, Israel, in September 1987.

CONDENSED CONTENTS

- I. Environments of Depositions** (8 chapters by Ward et al., Belkin and Jannasch, Cohen, Guerrero and Mas, Zohary, Oren, de Winder et al., and Lazar et al.)
- II. Structure and Function of Benthic Microbial Communities** (9 chapters by D'Amelio et al.,

Dor and Paz, Jørgensen, Palmisano et al., Revsbech et al., Ghiorse, Skyring et al., Oremland and King, and Des Marais et al.)

- III. Regulation of Adhesion and Hydrophobicity of Cell Surfaces in the Formation of Microbial Mats** (6 chapters by Shilo, Bar-Or et al., Rosenberg et al., Low and White, Marshall, and Rosenberg)

- IV. Physiology of Major Mat-Building Microorganisms** (10 chapters by Stal et al., Padan, Caumette, Post et al., van Gemerden and de Wit, de Wit and van Gemerden, Paerl et al., Truper and Galinski, Kuenen, and Wimpenny)

- V. Evolution of Mat-Forming Photosynthetic Prokaryotes** (3 chapters by Avron, Turner et al., and Pierson and Olson)

- VI. Biogeochemistry of Microbial Mats** (4 chapters by Aizenshtat, Ward et al., Fredrickson et al., and Knoll)

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Genetics and Molecular Biology of Industrial Microorganisms

Editors: **Charles L. Hershberger** and **Stephen W. Queener**, *Eli Lilly & Co., Indianapolis, Indiana*, and **George Hegeman**, *Indiana University, Bloomington*

This far-reaching volume has been produced in recognition of recent advances in our understanding of bacterial and nonbacterial microbial systems in industry, including a great deal of new interest in products of eucaryotic microorganisms, and of the true industrial status of recombinant organisms. It brings together the work of leading researchers moving to maximize the industrial potential of recombinant DNA technology. The contents, summarized below, are based on the Fourth ASM Conference on the Genetics and Molecular Biology of Industrial Microorganisms (popularly known as the "Bloomington Conference"), held in 1988.

CONDENSED CONTENTS

- I. **Perspectives with Industrial Microorganisms** (4 chapters by Demain, Hopwood, Cundliffe, and Archer et al.)
- II. **Biosynthesis of Macrocyclic Lactones** (4 chapters by Epp et al., Richardson et al., Streicher et al., and Donadio et al.)
- III. **Genes for Antibiotic Resistance and Biosynthesis** (4 chapters by Mansouri et al., Strohl et al., Donovan et al., and Suárez et al.)
- IV. **Genes for Developmental and Biosynthetic Pathways** (4 chapters by Chater, Champness et al., Schottel et al., and Tiraby et al.)
- V. **Genetic Structure and Plasticity in Streptomyces** (4 chapters by Cullum et al., Schrempl et al., Kinashi, and Hershberger et al.)
- VI. **Genetic Analysis and Manipulation in Streptomyces** (4 chapters by Stuttard, Baltz and McHenny, Chung and Crose, and Beckmann et al.)
- VII. **Applications of Dividing Bacteria** (4 chapters by Lazarus et al., Wubbolts and Timmis, DeVault et al., and Reeve)
- VIII. **Heterologous Protein Products from Cell Culture** (2 chapters by Kellems et al. and Grinnell et al.)
- IX. **Molecular Studies in β -Lactam-Producing Fungi and Streptomyces** (5 chapters by Jensen et al., Miller and Ingolia, Penalva et al., Veenstra et al., and Baldwin et al.)
- X. **Molecular Biology and Regulation in Filamentous Fungi** (5 chapters by Marzluf and Fu, Ward, Finkelstein et al., Devchand et al., and Hynes and Andrianopoulos)
- XI. **Expression of Heterologous Proteins in Yeasts** (5 chapters by Mervhack et al., Thim et al., Bitter, Shuster et al., and Cregg et al.)

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