"Not everyone is mindful of it, but cell biologists have two cells of interest: the one they are studying and Escherichia coli."
—From the Introduction

More is known about Escherichia coli and its close relative Salmonella typhimurium than about any other organism. These bacteria are likely to become the first free-living cells to have all their genes and gene products identified, their metabolic and assembly processes elucidated, and their regulatory and coordinating devices understood. Their convenient properties have made them the popular choices for research in bacteriophage functions and genetics, enzymatic function and adaptation, genetic analysis, biosynthetic pathways, bacterial physiology, and regulation of gene expression. The wealth of information from several decades of intensive study has never before been assembled to permit an assessment of current knowledge and facilitate future research.

Written by over 100 leading biologists under the guidance of an editorial board representing diverse scientific disciplines, this two-volume set presents a comprehensive synthesis of the entire body of current knowledge on E. coli and S. typhimurium.

This landmark publication should prove fascinating and extremely helpful to all investigators and students of the most fundamental biological questions in genetics, molecular biology, biochemistry, and microbial and cellular physiology and regulation.

**CONDESED CONTENTS**

**PART I. MOLECULAR ARCHITECTURE AND ASSEMBLY OF CELL PARTS**: Chemical composition, outer and cytoplasmic membranes, murein sacculus, periplasm and protein secretion, flagella, fimbriae, nucleoids, and ribosomes

**PART II. METABOLISM AND GENERAL PHYSIOLOGY**
- Class I Reactions: Generation of Precursor Metabolites and Energy
- Class II Reactions: Conversion of Precursor Metabolites to Small-Molecule Building Blocks
- Class III Reactions: Formation and Processing of Polymers
- Energy for Cell Activities: Motility and chemotaxis, ATP-coupled solute transport, osmotic-shock-sensitive transport, growth yield and energy distribution

**PART III. GENOME AND GENETICS**
- The Genome: Linkage maps, gene-protein index, genome organization; selectable phenotypes, native insertion sequence elements
- Genome alterations: Mutagenesis, general and site-specific recombination, DNA repair, transposition and transposable elements, insertion maps
- Gene transfer techniques: Conjugation (F factor, Hfr strains, F' strains, F- and R-prime factors); transduction (generalized and specialized); DNA transformation methods
- Mapping techniques and measurement of chromosome size
- Useful host and mutant strains/recombinant-DNA techniques

**PART IV. REGULATION OF GENE EXPRESSION**
- General Mechanisms: Transcription initiation and attenuation, transcript elongation/termination, translation initiation, proteolysis
- Multigene System: Regulons; carbon/nitrogen utilization; phosphate regulation; heat shock, SOS, and stringent responses; ribosomes and tRNA; aminoacyl-tRNA synthetases/translation factors
- Operon Regulation: Historical; maltose regulon; lactose, tryptophan, t-arabinose, galactose, proline, and D-serine deaminase operons

**PART V. GROWTH OF CELLS AND CULTURES**: Growth modulation of cell characteristics; effects of temperature, pH, water, and pressure; chromosome replication regulation; cell division; cell cycle synthetic activities; bacterial variability and individuality

**PART VI. ECOLOGY, EVOLUTION, AND POPULATION STRUCTURE**: Colicins and Col plasmids, natural genetic structure/variation, enteric bacteria evolutionary history

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Phosphate Metabolism and Cellular Regulation in Microorganisms

Editors:
Annamaria Torriani-Gorini, Massachusetts Institute of Technology, Cambridge, Mass.;
Frank G. Rothman, Brown University, Providence, R.I.;
Simon Silver, University of Illinois College of Medicine, Chicago, Ill.;
Andrew Wright, Tufts University Medical School, Boston, Mass.;
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 regulator, alkaline phosphatase gene regulation/phosphate response, pho regulon regulatory genes, PhoE protein expression, acid phosphatase regulatory characteristics
II. Phosphate Regulation in Diverse Organisms (4 chapters)
   Bacillus licheniformis alkaline phosphatase: proteins and genes; Saccharomyces cerevisiae phosphatase synthesis regulation, phosphatase multigene family, and acid phosphatase synthesis
III. Protein Secretion and Use of Alkaline Phosphatase (7 chapters)
   E. coli: phosphate-binding-protein synthesis/export machinery, phospholipids in protein secretion/energetics, foreign-protein secretion into periplasm, lamB protein export; alkaline phosphatase: protein secretion analysis, enzymatic activity and cellular location, membrane protein insertion into cytoplasmic membrane
IV. Structure and Function of Alkaline Phosphatase (4 chapters)
   Site-directed mutagenesis, crystal structure, multienzyme NMR analytical approaches, E. coli isozyme formation/molecular mechanism
V. Transport of Phosphate and Phosphorylated Compounds in Escherichia coli (7 chapters)
   PhoE protein structure/function; glycerol 3-phosphate transport: glpF, gglp, and wup-dependent systems
VI. Mechanisms and Energetics of Phosphate Transport in Other Organisms (4 chapters)
   Pseudomonas aeruginosa outer membrane protein P phosphate-binding site, 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 Iwoffii 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/cyclic pyrophosphates, inorganic pyrophosphate-supplied metabolic energy, Rhodospirillum rubrum energy conversion, regulation of pyrophosphate metabolism in plants
IX. Global Regulatory Systems in Enteric Bacteria (6 chapters)
    Bacterial 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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Publication date: July 1987.
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The development of recombinant DNA and other genetic techniques, along with an increased awareness of the impact of humanity on the environment, has led to debate on the benefits and risks of releasing the living products of these techniques into the environment.

How can such organisms be designed for maximum benefit and minimum risk? How can these qualities be predicted and assessed?

These issues were addressed by distinguished scientists from a variety of fields—ecology, genetics, microbiology, molecular biology—at a symposium organized by ASM in collaboration with seven other scientific societies. Their contributions are presented in Engineered Organisms in the Environment: Scientific Issues.

Focus on Design and Risk-Benefit Analysis

Case history presentations cover the development of several projects that are close to practical application. The ecology of the introduction of organisms into a new environment is examined from many perspectives. Papers and discussions focus on assessment techniques and risk analysis.

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- Other Introductions into the Environment
- Biological Responses to Perturbation: Genome to Ecosystem
- Future Trends: Toward a Predictive Capability

Essential Reading for Scientists and Laymen

Nonscientists involved in public policy on biotechnology will be interested in the lay summary of the book, written by Bernard Dixon, as well as the session summaries and the floor discussions.

Genetically engineered organisms, their development and their wise use, are the concern of many fields ranging from macroecology to molecular biology. A free flow of information among related scientific disciplines is essential. Engineered Organisms in the Environment: Scientific Issues is a significant contribution to this important, ongoing dialogue.
Bacteriophage T4

Editors: Christopher K. Mathews, Elizabeth M. Kutter, Gisela Mosig, Peter B. Berget

The outcome of the Evergreen T4 Meetings, this book presents a complete overview of T4 research, from its earliest history to its latest developments. T4 is a remarkable organism, one that has played an important part in the growth of molecular biology research. Here its story is told for the first time in one place. From Doermann's Introduction to the Early Years of Bacteriophage T4 to Guttman and Kutter's Overview to Mathews' Postscript, this book is informative, comprehensive, and up-to-date.

The book will be useful for upper-level students, virologists, and molecular biologists—in fact, indispensable for anyone with an interest in bacteriophage T4.

The papers are arranged in the following sections:

I. T4 Structure and Initiation of Infection
II. DNA Metabolism
   A. Enzymes and Proteins of DNA Metabolism
   B. DNA Metabolism In Vivo
III. Regulation of Gene Expression
   A. Transcription
   B. Processing and Translation
IV. Morphogenesis
V. Structure, Organization, and Manipulation of the Genome
VI. Some Complexities of T4 Genes, Gene Products, and Gene Product Interactions

An appendix presents a table of T4 genes and gene products.

Ordering Information:

Publication Date: August 1983
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STREPTOCOCCAL GENETICS

Edited by

JOSEPH J. FERRETTI
University of Oklahoma Health Science Center
Oklahoma City, Okla.

ROY CURTISS III
Washington University
St. Louis, Mo.

Streptococcal Genetics presents a compilation of the most recent work in this important area, featuring over sixty contributions from the leading workers in the field. There has been a dramatic increase in interest and activity on this subject over the past few years, as investigators from all disciplines have embraced the new approaches and tools that genetic studies afford.

Initially, streptococcal genetics research centered on the study of gene transfer, antibiotic resistance, and plasmid biology. However, in recent years there has been an emphasis on genetic aspects of streptococcal virulence, pathogenicity, and metabolism. These studies are directed towards the major health problems associated with streptococcal diseases, namely, rheumatic heart disease, glomerulonephritis, dental caries, neonatal meningitis and sepsis, pneumonia, and skin and throat infections. Additionally, basic studies aimed at the elucidation of streptococcal fermentation pathways are of prime importance for food processing and dairy industries.

This volume is divided into five major sections, each with an introduction presenting an overview and historical perspective for each of the topics. Useful appendices give information on streptococcal cloning vectors, nucleotide sequences, and amino acids. An attractive volume for both new and established investigators. Based on the Second ASM Conference on Streptococcal Genetics, May 1986.

CONDENSED CONTENTS

I. Gene Transfer (8 chapters)
Streptococcus sex pheromones, plasmid-related conjugation, transposons and mutagenesis, cloning systems, restriction systems, genetic transformation.

II. Antibiotic Resistance (10 chapters)
Resistance determinants, genes and products, conjugative transposons, natural genetic-information transfer, plasmid-borne resistance genes and products.

III. Pathogenic Streptococci (23 chapters)
M proteins: structural and genetic relationships, phase variation, genes, transcriptional studies of phase variants, surface expression; immunoglobulin G receptor gene; human and animal isolates; homologous sequences and host specificity; DNA fingerprints; exotoxins: genes and characterizations; streptokinase and amidas; plasmid hemolysin/bacteriocin determinants; hemolysin production; virulence; surface protein; immunoglobulin A1 protease gene; competition control region.

IV. Oral Streptococci (7 chapters)

V. Lactic Acid Streptococci (6 chapters)
β-Galactosidase gene and plasmids, transformation by electroporation, spheroplast transfection, Tn917, metabolic traits, plasmid-encoded structural genes, lactose metabolism, bacteriophages, bacteriophage insensitivity mechanisms.

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