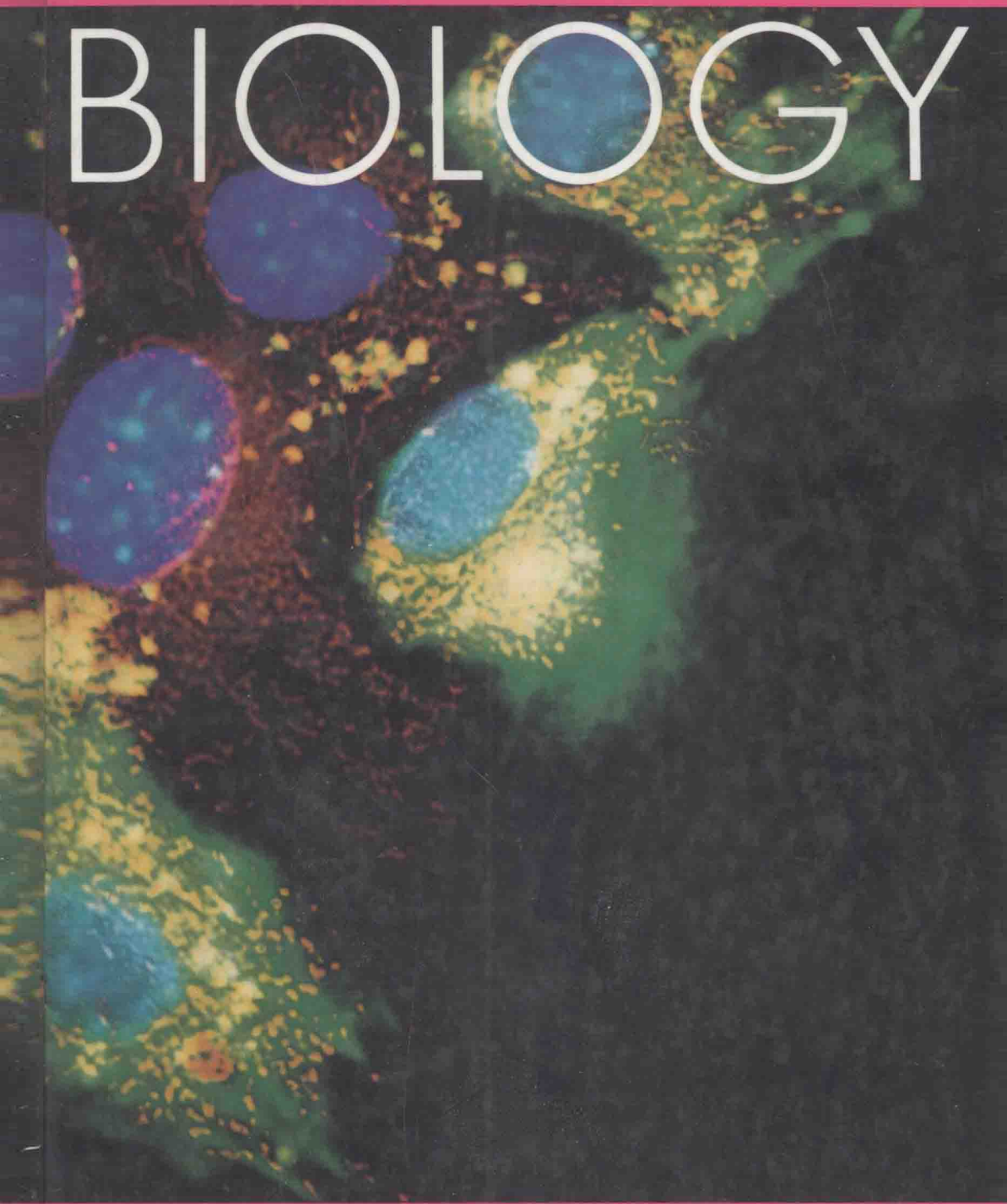
OPPORTUNITIES IN BIOLOGY



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OPPORTUNITIES IN BIOLOGY

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Board on Biology
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National Research Council

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Preface

In 1970 the National Research Council published *Biology and the Future of Man*. This report, edited by Philip Handler, then president of the National Academy of Sciences, summarized the state of biology at that time. Now, almost 20 years later, the National Research Council, with the publication of this report, reevaluates research opportunities in biology and attempts to convey the current excitement in the field of biology. Our report differs from *Biology and the Future of Man* because of the enormous advances that have occurred in biology over the past two decades. The field has, in fact, changed to the point that no single individual can hope to grasp all of the new activities and opportunities.

To address this daunting task, a committee of distinguished scientists began in late 1985 to determine the major research areas that exist in the field of biology and then to discuss how advances in each of these areas can be maximized and how and where possible interactions among biologists of various subdisciplines and biologists and other scientists can be facilitated to lead to new interdisciplinary insights and approaches. This committee of 20 individuals soon realized that such a goal would require the assistance of many other experts. Toward this end the committee organized 11 panels, each with at least one individual from the committee. Each panel was asked to produce a report of about 50 pages stressing the current and future opportunities for exciting research in their area of expertise and also to stress the interconnections of biological scientists with others from different areas of biology and from other disciplines. Even the panels found that they needed assistance; thus the input of additional individuals was solicited for the report.

The steering committee edited these reports, in some cases combining the efforts of several groups to produce a single chapter, in other instances letting panel topics stand as chapters in the final report. The committee report then

underwent an extensive review process. The reviewers' comments were extremely useful to the committee in polishing and producing the final draft of the report.

This report reflects the panoply of interesting and exciting topics that constitute biology. Some areas are barely covered and still others not at all. This is by necessity: There is just too much information today in biology, a fact illustrated by the length of high school and college introductory textbooks that can characteristically exceed 1,000 pages. In selecting areas to be included we chose those that represent major themes in biological research. In many cases such selections were difficult, since most of biology today is expanding as new techniques and ideas are applied to old fields or to new areas.

We have produced this volume for a large audience: biologists; policymakers both in government, universities, and in industry; and other scientists from a variety of disciplines who may interact with biologists. We hope that each of these groups will learn from this book. For all of you who read this report, our goal is to leave you with some understanding and appreciation of the diversity of problems and opportunities that await the biologist. Some of these opportunities will provide us with a better understanding of the basic workings of life, and others will have immediate application in our lives through medicine, agriculture, or environmental management.

In any such effort it is important to acknowledge the work of the many individuals, in addition to the committee members, who contributed to this effort. Those who served on the panels and contributed material to the panels are listed in the section following the committee list. My thanks to all of them. I also thank the staff of the National Research Council for their efforts. Frances Walton cheerfully provided the administrative support necessary for the committee to meet and function. Kathy Marshall spent long hours skillfully preparing the many drafts of the manuscript. Caitilin Gordon provided expert editorial assistance. Walt Rosen and David Policansky provided panel support early in the project and continued to contribute as the project progressed. In particular, I acknowledge the dedicated staff support of John Burris and Cliff Gabriel. John was the project director throughout the effort, organizing the committee and helping it through the early drafts. Cliff shepherded the effort through its later stages, assuming oversight of the manuscript in later drafts and the review process, a labor of great effort and dedication. To them, and all others who worked so hard to produce this study, I offer my most sincere appreciation.

PETER H. RAVEN, *Chairman*
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Contents

EXECUTIVE SUMMARY 1

1 THE NEW BIOLOGY 15

2 NEW TECHNOLOGIES AND INSTRUMENTATION 19
RECOMBINANT DNA TECHNIQUES, 19
Transformation of Higher Organisms, 21; Making a Transgenic Animal, 23; Creating Transgenic Plants, 26; Future Prospects, 26
MONOCLONAL ANTIBODIES, 27
MICROCHEMICAL TECHNIQUES, 28
FLOW CYTOMETRY, 31
MICROSCOPY, 32
Video-Enhanced Contrast Microscopy, 33; Low-Light-Dose Microscopy, 33; Scanning Acoustic Microscope, 34; Scanning Tunneling and Atomic Force Microscope, 34
MAGNETIC RESONANCE, 35
COMPUTERS AND DATA ANALYSIS, 36
BIOLOGY AND THE FUTURE, 37

3 MOLECULAR STRUCTURE AND FUNCTION 39
PRIMARY STRUCTURE, 43
THREE-DIMENSIONAL STRUCTURE, 51
MOLECULAR ASSEMBLIES, 60
DIRECTED MODIFICATION OF PROTEINS, 67
FOLDING, 71
NEW TECHNIQUES AND INSTRUMENTATION, 75

4 GENES AND CELLS 77
RESEARCH STRATEGIES, 78
THE NUCLEUS, 79
Nuclear Envelope, 80; Chromosomes, 81; The Nucleolus, 84
GENES AND GENE ACTION, 84
Genetic Analysis, 85; The Genome, 88; DNA Replication, 90; Recombination, 93; DNA Repair and Mutagenesis, 96; Gene Expression, 98; Genome Organization, 103
CYTOPLASM: ORGANELLES AND FUNCTIONS, 104
Protein Synthesis and Regulation, 105
MITOCHONDRIA: FUNCTION AND BIOGENESIS, 108
CELL MOTILITY AND THE CYTOSKELETON, 111
Cell Structure, 111; Cell Movement, 113
CELL MEMBRANE, 115
THE EXTRACELLULAR MATRIX OF ANIMALS, 117
CELL REGULATION, 118
Cell Division, 118; Cell-to-Cell Communication, 120; Growth Factors, 122; Receptors, 123; Transmembrane Signaling, 124; Oncogenes, 133
GENERAL PLANT CELL BIOLOGY, 134
Chloroplasts, 135; The Plant Cell Wall, 137

5 DEVELOPMENT 140
DEVELOPMENT BEGINS WITH GAMETOGENESIS, 142
CELL DIVISION, GROWTH, AND DEVELOPMENTAL TIMING, 146
DIFFERENTIAL GENE EXPRESSION, 153
CELL MOVEMENT AND CELL ADHESION, 159
POSITIONAL INFORMATION, 164
DEVELOPMENT IS FOR ADULT ANIMALS TOO, 167
SPECIAL PROBLEMS IN PLANT DEVELOPMENT, 169
Plant Cell Growth, 171; The Development of Plant Organs, 174

6 THE NERVOUS SYSTEM AND BEHAVIOR 175
NERVE CELL COMMUNICATION, 182
THE CYTOSKELETON AND THE TRANSPORT OF MATERIALS WITH NERVE CELLS, 187
Slow Axonal Transport, 188; Rapid Axonal Transport, 189
DEVELOPMENT OF THE NERVOUS SYSTEM, 189
Selective Cell Aggregation, 192
NEURAL PLASTICITY AND ELEMENTARY FORMS OF LEARNING, 198

NEUROBIOLOGY OF PERCEPTION: VISION, 201
Behavioral Studies of Vision in Animals, 204
NEUROBIOLOGY OF MOTOR CONTROL, 205
NEUROBIOLOGY OF COGNITION, 210
Attention, 212; Psychobiology of Development, 213
BEHAVIORAL ECOLOGY, 214
ABNORMALITIES OF BEHAVIOR, 219

7 THE IMMUNE SYSTEM AND INFECTIOUS DISEASES 224
THE IMMUNE SYSTEM, 224
Specificity of the Immune Response, 225; B Lymphocytes, 229; T Cells, 233; Regulation of the Immune Response, 239; Complement and Other Effector Molecules, 241; Hypersensitivity, Inflammation, and Phagocytosis, 241
INFECTIOUS DISEASES, 244
Entry into the Host, 245; Spread in the Host, 249; Interactions of Viruses with the Host Cell, 251; Cell and Tissue Tropism, 252; How Is Injury Mediated?, 254; Persistent Infections, 258
CONCLUSION, 258

8 EVOLUTION AND DIVERSITY 260
THE EVOLUTIONARY PROCESS, 265
THE RESULT OF EVOLUTION, 270
EVOLUTIONARY HISTORY, 279
CURRENT STATUS OF RESEARCH, 283
Collections and Special Facilities, 284

9 ECOLOGY AND ECOSYSTEMS 287
INTRODUCTION, 287
IDEAS AND APPROACHES IN ECOLOGY, 288
The Responses of Organisms to Environmental Variations, 288; Structure and Regulation of Populations, 290; Chemical Ecology, 292; Behavioral Ecology, 295; Genetic Ecology, 298; The Union of Behavioral, Population, and Genetic Ecology, 299; Ecosystem and Community Ecology, 301
HUMAN-CAUSED ENVIRONMENTAL CHANGES, THE PROBLEMS THEY CAUSE, AND SOME SOLUTIONS, 305
Species Loss and Conservation Ecology, 307; Global Climate Change, 313
TECHNOLOGICAL AND METHODOLOGICAL ADVANCES, 314

Remote Sensing, 314; Analytic Chemistry, 315; Tools for Studying Paleoecology, 315; Stable Isotopes, 316; Biotechnology, 317; Models in Ecology, 317
CONCLUSION, 321

10 ADVANCES IN MEDICINE, THE BIOCHEMICAL PROCESS INDUSTRY, AND ANIMAL AGRICULTURE 323
ADVANCES IN MEDICINE, 323
Molecular Pharmacology and Human Disease, 324; New Approaches to Understanding Health and Disease: The Lipoproteins, 328
ARTHRITIS, 334
CANCER: CURRENT STATUS AND SOME NEW APPROACHES TO ITS CONTROL, 336
Cancer Therapy, 337; Newer Approaches to Cancer Control, 339
ADVANCES IN UNDERSTANDING HUMAN GENETIC DISORDERS, 344
Elucidation of the Primary Genetic Defect, 345; Gene Diagnosis, 346; Gene Therapy, 347
NEW APPROACHES FOR CONTROL OF MICROBIAL INFECTION, 348
Vaccines, 349; Antiviral Agents, 351
ADVANCES IN THE BIOCHEMICAL PROCESS INDUSTRY, 352
Goals in Industrial Biotechnology, 353
ADVANCES IN ANIMAL AGRICULTURE, 359
Growth Regulation, 360; Reproduction, 361; Lactation, 362; Infectious Disease, 362; Production of Feedstocks, 363; Livestock Improvement, 363

11 PLANT BIOLOGY AND AGRICULTURE 365
PLANTS AND THEIR ENVIRONMENT, 366
PHOTOSYNTHESIS, 371
NITROGEN FIXATION, 377
PLANT GROWTH AND DEVELOPMENT, 381
Plant Hormones, 381; Environment, 384; Plant Reproduction, 385
PLANT-PATHOGEN INTERACTIONS, 390
GENETIC IMPROVEMENT OF PLANTS, 397
Tissue Culture, 397; Plant Cell Transformation, 400