Genetics and Biotechnology of Bacilli

Edited by

A. T. GANESAN
and
JAMES A. HOCH

Genetics and Biotechnology of Bacilli

Edited by

A. T. GANESAN
Department of Genetics
Stanford University Medical School
Stanford, California

JAMES A. HOCH
Department of Cellular Biology
Research Institute of Scripps Clinic
La Jolla, California

1984

ACADEMIC PRESS, INC.
(Harcourt Brace Jovanovich, Publishers)
Orlando San Diego New York London
Toronto Montreal Sydney Tokyo

COPYRIGHT © 1984, BY ACADEMIC PRESS, INC.
ALL RIGHTS RESERVED.
NO PART OF THIS PUBLICATION MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPY, RECORDING, OR ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT PERMISSION IN WRITING FROM THE PUBLISHER.

ACADEMIC PRESS, INC.
Orlando, Florida 32887

United Kingdom Edition published by
ACADEMIC PRESS, INC. (LONDON) LTD.
24/28 Oval Road, London NW1 7DX

Library of Congress Cataloging in Publication Data

International Conference on Genetics and Biotechnology of Bacilli (2nd : 1983 : Stanford University)
Genetics and biotechnology of bacilli.

"Proceedings of the Second International Conference on Genetics and Biotechnology of Bacilli, held at Stanford University, Stanford, California, July 6-8, 1983."
Includes index.
1. Bacillus subtilis--Congresses. 2. Bacillus thuringiensis--Congresses. 3. Bacterial genetics--Congresses. 4. Biotechnology--Congresses. I. Ganesan, A. T. II. Hoch, James A. III. Title.
QR82.B3I58 1983 589.9'5 84-45263
ISBN 0-12-274160-9 (alk. paper)

PRINTED IN THE UNITED STATES OF AMERICA

84 85 86 87 9 8 7 6 5 4 3 2 1

Genetics and Biotechnology of Bacilli

Academic Press Rapid Manuscript Reproduction

Proceedings of the Second International Conference
on the Genetics and Biotechnology of Bacilli
Held at Stanford University, Stanford, California
July 6–8, 1983

此为试读,需要完整PDF请访问: www.ertongbook.com

Contributors

Numbers in parentheses indicate the pages on which the authors' contributions begin.

Hannah Alexander[1] (223), *Department of Molecular Biology and Microbiology, Schools of Medicine, Veterinary Medicine, and Dental Medicine, Tufts University and Sackler School of Graduate Biomedical Sciences, Boston, Massachusetts 02111*

Juan-Carlos Alonso (413), *Max-Planck-Institut für Molekulare Genetik, D-1000 Berlin 33, Federal Republic of Germany*

Hiroyuki Anaguchi (333), *Department of Applied Biochemistry, Hiroshima University, Fukuyama 720, Japan*

Amil G. Anderson (19), *Department of Microbiology and Immunology, University of North Carolina School of Medicine, Chapel Hill, North Carolina 27514*

Linda Anderson (413), *Department of Microbiology, University of North Carolina, Chapel Hill, North Carolina 27514*

Tadahiko Ando (413), *Department of Microbiology, Riken Institute, Saitama 351, Japan*

Maryvonne Arnaud (113), *Institut Pasteur, 75724 Paris Cedex 15, France*

Arthur I. Aronson (359), *Department of Biological Sciences, Purdue University, West Lafayette, Indiana 47907*

Elisabeth Aubert (113), *Institut Pasteur, 75724 Paris Cedex 15, France*

Hitoshi Ayaki (333), *Department of Applied Biochemistry, Hiroshima University, Fukuyama 720, Japan*

R. R. Azizbekyan (345), *Institute of Genetics and Selection of Industrial Microorganisms, VNII Genetica, Moscow 113545, USSR*

Carl D. B. Banner (163), *Department of Molecular Genetics, Genex Corporation, Gaithersburg, Maryland 20877*

Marjorie H. Barnes (413), *Department of Pharmacology, University of Massachusetts Medical School, Worcester, Massachusetts 01605*

William Beckman (359), *Department of Biological Sciences, Purdue University, West Lafayette, Indiana 47907*

Kenneth F. Bott (19), *Department of Microbiology and Immunology, University of North Carolina School of Medicine, Chapel Hill, North Carolina 27514*

[1]Present address: Department of Molecular Biology, Research Institute of Scripps Clinic, La Jolla, California 92037.

Allan M. Campbell (3), *Department of Biology, Stanford University, Stanford, California 94305*

Bruce C. Carlton (387), *Department of Molecular and Population Genetics, University of Georgia, Athens, Georgia 30602*

Glenn H. Chambliss (407), *Department of Bacteriology, University of Wisconsin, Madison, Wisconsin 53706*

Ellson Y. Chen (173), *Molecular Biology Department, Genentech, Inc., South San Francisco, California 94080*

G. G. Chestukhina (345), *Institute of Genetics and Selection of Industrial Microorganisms, VNII Genetica, Moscow 113545, USSR*

V. G. Debabov (345), *Institute of Genetics and Selection of Industrial Microorganisms, VNII Genetica, Moscow 113545, USSR*

Aline I. Desmyter (235), *Department of Microbiology, Ohio State University, Columbus, Ohio 43210*

Roy H. Doi (209), *Department of Biochemistry and Biophysics, University of California, Davis, California 95616*

Eugenie Dubnau (407), *Department of Microbiology, Public Health Research Institute, New York, New York 10016*

E. J. Duvall (275), *Department of Biological Sciences, University of Maryland, Baltimore County, Catonsville, Maryland 21228*

Manuel Espinosa[2] (413), *Department of Biology, Brookhaven National Laboratory, Upton, New York 11973*

Stanley Falkow (9), *Department of Medical Microbiology, Stanford University Medical School, Stanford, California 94305*

Eugenio Ferrari (173, 323), *Biocatalysis Department, Genentech, Inc., South San Francisco, California 94080*

Franco Ferrari (323), *Syntro Corporation, San Diego, California 92121*

David Filpula (163), *Department of DNA Chemistry, Genex Corporation, Gaithersburg, Maryland 20877*

Agnès Fouet (113), *Institut Pasteur, 75724 Paris Cedex 15, France*

Allessandro Galizzi (407), *Department of Genetics and Microbiology, University of Pavia, 27100 Pavia, Italy*

Philippe Gay (141), *Laboratoire Genetique et Membranes, Institut Jacques Monod, CNRS et Université Paris 7, 75251 Paris Cedex 05, France*

Michael S. Gilmore (265), *Institut für Genetik und Mikrobiologie, D-8700 Würzburg, Federal Republic of Germany*

Werner Goebel (265), *Institut für Genetik und Mikrobiologie, D-8700 Würzburg, Federal Republic of Germany*

David S. Goldfarb[3] (209), *Department of Biochemistry and Biophysics, University of California, Davis, California 95616*

[2]Present address: Instituto de Inmunologia y Biologia Microbiana, C.S.I.C., Madrid-6, Spain.

[3]Present address: Department of Structural Biology, Stanford University Medical School, Stanford, California 94305.

José M. González, Jr. (387), *Department of Molecular and Population Genetics, University of Georgia, Athens, Georgia 30602*
Christopher J. Green (35), *SRI International, Menlo Park, California 94025*
Donald M. Green (413), *Department of Biochemistry, University of New Hampshire, Durham, New Hampshire 03824*
M. Ya. Haykinson (297), *Institute of Genetics and Selection of Industrial Microorganisms, VNII Genetica, Moscow 113545, USSR*
A. P. Healey[4] (67), *Department of Biochemistry, University of Sydney, New South Wales 2006, Australia*
Dennis J. Henner (173, 249), *Molecular Biology Department, Genentech, Inc., South San Francisco, California 94080*
Hirohiko Hirochika (333), *Institute for Plant Virus Research, Tsukuba Science City, Ibaraki 305, Japan*
Hideo Hirokawa (403), *Life Sciences Institute, Sophia University, Tokyo 102, Japan*
James A. Hoch (323), *Department of Cellular Biology, BCR2, Research Institute of Scripps Clinic, La Jolla, California 92037*
Philippe Hoet (403), *University of Louvain, 1200 Brussels, Belgium*
T. P. Iismaa (67), *Department of Biochemistry, University of Sydney, New South Wales 2006, Australia*
Charles Johnson (407), *The Biological Laboratories, Harvard University, Cambridge, Massachusetts 02138*
L. Kääriäinen (153), *Recombinant DNA-Laboratory, University of Helsinki, 00380 Helsinki 38, Finland*
N. Kalkkinen (153), *Recombinant DNA-Laboratory, University of Helsinki, 00380 Helsinki 38, Finland*
Muriel Kauffmann (309), *Transgene S.A., 67000 Strasbourg, France*
Fujio Kawamura[5] (333), *Institute of Applied Microbiology, University of Tokyo, Tokyo 113, Japan*
André Klier (113), *Institut Pasteur, 75724 Paris Cedex 15, France*
Yasuo Kobayashi (333), *Department of Applied Biochemistry, Hiroshima University, Fukuyama 720, Japan*
Ronald Korn[6] (79), *Department of Molecular, Cellular and Developmental Biology, University of Colorado, Boulder, Colorado 80309*
Jürgen Kreft (265), *Institut für Genetik und Mikrobiologie, D-8700 Würzburg, Federal Republic of Germany*
J. W. Kronstad (375), *Department of Microbiology and Immunology, SC-42, University of Washington, Seattle, Washington 98195*

[4]Present address: Queensland Institute of Medical Research, Brisbane 4006, Australia.
[5]Present address: Department of Biochemistry and Biophysics, University of California, Davis, California 95616.
[6]Present address: Albert Einstein College of Medicine, Bronx, New York 10461.

J. Oliver Lampen (129), *Waksman Institute of Microbiology, Rutgers–The State University of New Jersey, Piscataway, New Jersey 08854*

Jose M. Lazaro (195), *Centro de Biología Molecular (CSIC-UAM), Universidad Autónoma, Canto Blanco, Madrid-34, Spain*

Jean-Pierre Lecocq (309), *Transgene S.A., 67000 Strasbourg, France*

Dominique Le Coq (113, 141), *Institut Jacques Monod, 75251 Paris Cedex 05, France*

Stuart F. J. LeGrice[7] (223), *Department of Molecular Biology and Microbiology, Schools of Medicine, Veterinary Medicine and Dental Medicine, Tufts University and Sackler School of Graduate Biomedical Sciences, Boston, Massachusetts 02111*

P. Lehtovaara[8] (153), *Recombinant DNA-Laboratory, University of Helsinki, 00380 Helsinki 38, Finland*

P. S. Lovett (275), *Department of Biological Sciences, University of Maryland, Baltimore County, Catonsville, Maryland 21228*

K. Lundström[9] (153), *Recombinant DNA-Laboratory, University of Helsinki, 00380 Helsinki 38, Finland*

Robert Marrero (403), *Department of Molecular, Cellular and Developmental Biology, University of Colorado, Boulder, Colorado 80309*

Timothy McKenzie (79), *Department of Molecular, Cellular and Developmental Biology, University of Colorado, Boulder, Colorado 80309*

Rafael P. Mellado (195), *Centro de Biología Molecular (CSIC-UAM), Universidad Autónoma, Canto Blanco, Madrid-34, Spain*

Peter S. F. Mézes (129), *Waksman Institute of Microbiology, Rutgers–The State University of New Jersey, Piscataway, New Jersey 08854.*

Stephan Miller[10] (223), *Department of Molecular Biology and Microbiology, Schools of Medicine, Veterinary Medicine, and Dental Medicine, Tufts University and Sackler School of Graduate Biomedical Sciences, Boston, Massachusetts 02111*

Scott A. Minnich (359), *Department of Biological Sciences, Purdue University, West Lafayette, Indiana 47907*

Sumi Mizumoto (51), *Cancer Research Institute, Kanazawa University, Kanazawa 920, Japan*

S. Mongkolsuk (275), *Department of Biological Sciences, University of Maryland, Baltimore County, Catonsville, Maryland 21228*

Shigeki Moriya (51), *Cancer Research Institute, Kanazawa University, Kanazawa 920, Japan*

[7]Present address: Institute for Biology, F. Hoffmann–La Roche & Co., A.G., CH-4002 Basel, Switzerland.

[8]Present address: Biotechnical Laboratory, Recombinant-DNA-Group, SF-02150 Espoo 15, Finland

[9]Present address: Research Laboratories of the Finnish State Alcohol Company ALKO Ltd., SF-00101 Helsinki, Finland.

[10]Present address: Department of Microbiology, Harvard School of Public Health, Boston, Massachusetts 02115.

Bodo Müller (265), *Institut für Genetik und Mikrobiologie, D-8700 Würzburg, Federal Republic of Germany*

Akira Nakayama (181), *Institute of Biological Sciences, University of Tsukuba, Sakura 305, Japan*

Masanao Oda (333), *Department of Applied Biochemistry, Hiroshima University, Fukuyama 720, Japan*

Naotake Ogasawara (51), *Cancer Research Institute, Kanazawa University, Kanazawa 920, Japan*

Kazutaka Ohmura (181), *Institute of Biological Sciences, University of Tsukuba, Sakura 305, Japan*

Masaji Okamoto (333), *Department of Applied Biochemistry, Hiroshima University, Fukuyama 720, Japan*

George Ordal (413), *Department of Biochemistry, University of Illinois, Urbana, Illinois 61801*

G. R. Ostroff[11] (285), *Department of Pharmacology, University of Massachusetts Medical School, Worcester, Massachusetts 01605*

Kiyotaka Otozai (181), *Institute of Biological Sciences, University of Tsukuba, Sakura 305, Japan*

I. Palva (153), *Recombinant DNA-Laboratory, University of Helsinki, 00380 Helsinki 38, Finland*

J. J. Pène (285), *School of Life and Health Sciences, University of Delaware, Newark, Delaware 19716*

John B. Perkins (103), *Department of Cellular and Developmental Biology, The Biological Laboratories, Harvard University, Cambridge, Massachusetts 02138*

R. Pettersson (153), *Recombinant DNA-Laboratory, University of Helsinki, 00380 Helsinki 38, Finland*

Chester W. Price (209, 407), *Department of Biochemistry and Biophysics, University of California, Davis, California 95616*

P. M. Rabinovich (297), *Institute of Genetics and Selection of Industrial Microorganisms, VNII Genetica, Moscow 113545, USSR*

Benny Rådén (403), *Department of Bacteriology, Karolinska Institutet, S-104 01 Stockholm, Sweden*

Georges Rapoport (113), *Institut Pasteur, 75724 Paris Cedex 15, France*

Pascal Ratet[12] (141), *Laboratoire Genetique et Membranes, Institut Jacques Monod, CNRS et Université Paris 7, 75251 Paris Cedex 05, France*

John N. Reeve (235), *Department of Microbiology, Ohio State University, Columbus, Ohio 43210*

Bernard E. Reilly (403), *Department of Microbiology and Dentistry, University of Minnesota, Minneapolis, Minnesota 55455*

[11]Present address: Genzyme Corporation, Microbiology Research Center, Boston, Massachusetts 02111.

[12]Present address: Institut de Microbiologie, Université Paris-Sud, 91405 Orsay Cedex, France.

Hans J. Rhaese (407) , *Department of Biology, University of Frankfurt, Frankfurt 6000, Federal Republic of Germany*

Craig S. Rhodes (163), *Department of Molecular Genetics, Genex Corporation, Gaithersburg, Maryland 20877*

Jacqueline B. Rice (235), *Department of Microbiology, Ohio State University, Columbus, Ohio 43210*

Huiga Saito (333). *Institute of Applied Microbiology, University of Tokyo, Tokyo 113, Japan*

Margarita Salas (195), *Centro de Biología Molecular (CSIC-UAM), Universidad Autónoma. Canto Blanco, Madrid-34, Spain*

Kathleen Sandman (103), *Department of Cellular and Developmental Biology, The Biological Laboratories, Harvard University, Cambridge, Massachusetts 02138*

M. Sarvas (153), *National Public Health Institute, 00280 Helsinki 28, Finland*

H. E. Schnepf (375), *Department of Microbiology and Immunology, SC-42, University of Washington, Seattle, Washington 98195*

Hidenori Shimotsu[13] (333), *Institute of Applied Microbiology, University of Tokyo, Tokyo 113, Japan*

M. Sibakov (153), *Recombinant DNA-Laboratory, University of Helsinki, 00380 Helsinki 38, Finland*

M. T. Smith (67), *Department of Biochemistry, University of Sydney, New South Wales 2006, Australia*

Jose M. Sogo[14] (195), *Centro de Biología Molecular (CSIC-UAM), Universidad Autónoma, Canto Blanco, Madrid-34, Spain*

Abraham L. Sonenshein (223), *Department of Molecular Biology and Microbiology, Schools of Medicine, Veterinary Medicine and Dental Medicine, Tufts University and Sackler School of Graduate Biomedical Sciences, Boston, Massachusetts 02111*

Denis Speck (309), *Transgene S.A., 67000 Strasbourg, France*

Jean Spence[15] (323), *Syntro Corporation, San Diego, California 92121*

Mark L. Stahl (173), *Biocatalysis Department, Genentech, Inc., South San Francisco, California 94080*

Michel Steinmetz (141), *Laboratoire Genetique et Membranes, Institut Jacques Monod, CNRS et Université Paris 7, 75251 Paris Cedex 05, France*

A. I. Stepanov (297), *Institute of Genetics and Selection of Industrial Microorganisms, VNII Genetica, Moscow 113545, USSR*

V. M. Stepanov (345), *Institute of Genetics and Selection of Industrial Microorganisms, VNII Genetica, Moscow 113545, USSR*

Charles Stewart (403), *Department of Biology, Rice University, Houston, Texas 77001*

[13]Present address: Genentech, Inc., South San Francisco, California 94080.

[14]Present address: ETH, Institut für Zellbiologie, Hönggerburg, CH-8093 Zürich, Switzerland.

[15]Present address: Department of Biology, University of Utah, Salt Lake City, Utah 84112.

此为试读,需要完整PDF请访问: www.ertongbook.com

George C. Stewart[16] (19), *Department of Microbiology and Immunology, University of North Carolina School of Medicine, Chapel Hill, North Carolina 27514*
Noboru Sueoka (79), *Department of Molecular, Cellular and Developmental Biology, University of Colorado, Boulder, Colorado 80309*
K. Takkinen (153), *Recombinant DNA-Laboratory, University of Helsinki, 00380 Helsinki 38, Finland*
Gakuzo Tamura (181), *Department of Agricultural Chemistry, University of Tokyo, Tokyo 113, Japan*
Teruo Tanaka (79), *Department of Molecular, Cellular and Developmental Biology, University of Colorado, Boulder, Colorado 80309*
Leo D. Thompson (163), *Department of Molecular Genetics, Genex Corporation, Gaithersburg, Maryland 20877*
Donald J. Tipper (407), *Department of Molecular Genetics and Microbiology, University of Massachusetts, Worcester, Massachusetts 01605*
Kathleen Trach (323), *Department of Cellular Biology, BCR2, Research Institute of Scripps Clinic, La Jolla, California 92037*
Thomas Trautner (403), *Max-Planck-Institut für Molekulare Genetik, D-1000 Berlin 33, Federal Republic of Germany*
I. Ulmanen (153), *Recombinant DNA-Laboratory, University of Helsinki, 00380 Helsinki 38, Finland*
N. Vasantha (163), *Department of Molecular Genetics, Genex Corporation, Gaithersburg, Maryland 20877*
Gerard Venema (413), *Department of Genetics, Groningen University, Haren, The Netherlands 9751 NN*
Michael Vodkin (407), *Pathology Division, U.S. Army Research Institute of Infectious Disease, Fort Detrick, Frederick, Maryland 21701*
Barbara S. Vold (35), *SRI International, Menlo Park, California 94025*
Michael A. Von Tersch (407), *Department of Molecular and Population Genetics, University of Georgia, Athens, Georgia 30602*
R. G. Wake (67), *Department of Biochemistry, University of Sydney, New South Wales 2006, Australia*
Wu Wang (129), *Waksman Institute of Microbiology, Rutgers–The State University of New Jersey, Piscataway, New Jersey 08854*
Gerhard Weidinger[17] (265), *Institut für Genetik und Mikrobiologie, D-8700 Würzburg, Federal Republic of Germany*
A. S. Weiss (67), *Department of Biochemistry, University of Sydney, New South Wales 2006, Australia*
James A. Wells (173), *Biocatalysis Department, Genentech, Inc., South San Francisco, California 94080*

[16]Present address: Department of Microbiology, University of Kansas, Lawrence, Kansas 66045.
[17]Present address: Institut für Physiologische Chemie, D-8700 Würzburg, Federal Republic of Germany.

H. R. Whiteley (375), *Department of Microbiology and Immunology, SC-42, University of Washington, Seattle, Washington 98195*

D. M. Williams (275), *Department of Biological Sciences, University of Maryland, Baltimore County, Catonsville, Maryland 21228*

Scott Winston (79), *Department of Molecular, Cellular and Developmental Biology, University of Colorado, Boulder, Colorado 80309*

H. C. Wong[18] (375), *Department of Microbiology and Immunology, SC-42, University of Washington, Seattle, Washington 98195*

Sui-Lam Wong (209), *Department of Biochemistry and Biophysics, University of California, Davis, California 95616*

Hidetoshi Yamada (333), *Department of Applied Biochemistry, Hiroshima University, Fukuyama 720, Japan*

Kunio Yamane (181), *Institute of Biological Sciences, University of Tsukuba, Sakura 305, Japan*

Makari Yamasaki (181), *Department of Agricultural Chemistry, University of Tokyo, Tokyo 113, Japan*

Hisato Yamazaki (181), *Institute of Biological Sciences, University of Tsukuba, Sakura 305, Japan*

Yue-Qin Yang (129), *Waksman Institute of Microbiology, Rutgers–The State University of New Jersey, Piscataway, New Jersey 08854*

Daniel G. Yansura (249), *Department of Vaccine Development, Genentech, Inc., South San Francisco, California 94080*

Ronald Yasbin (413), *Department of Microbiology, University of Rochester, Rochester, New York 14642*

Yu. V. Yomantas (297), *Institute of Genetics and Selection of Industrial Microorganisms, VNII Genetica, Moscow 113545, USSR*

Hiroshi Yoshikawa (51), *Cancer Research Institute, Kanazawa University, Kanazawa 920, Japan*

Michael Young (89), *Department of Botany and Microbiology, University College of Wales, Aberystwyth, Dyfed SY23 3DA, United Kingdom*

Philip Youngman (103), *Department of Cellular and Developmental Biology, The Biological Laboratories, Harvard University, Cambridge, Massachusetts 02138*

Mark M. Zukowski[19] (309), *Transgene S.A., 67000 Strasbourg, France*

[18]Present address: Cetus Corp., Emeryville, California 94608.

[19]Present address: Amgen, 1900 Oak Terrace Lane, Thousand Oaks, California 91320.

Preface

The Second International Conference on the Genetics and Biotechnology of Bacilli was held at Stanford University on July 6–8, 1983. Over 280 scientists representing 17 countries gathered to exchange ideas about advances made in this field since the previous conference in 1981. The conference was made possible by the generous financial support of the Syntro Corporation of San Diego, California, and was sponsored by the Syntro Corporation and the Stanford Medical School.

Dr. Dominick Purpura, Dean of Stanford Medical School, and Dr. Thomas Parmeter, President of the Syntro Corporation, opened the conference with welcoming addresses. These were followed by keynote speeches by Dr. Allan M. Campbell, Professor of Biology at Stanford University, and Dr. Stanley Falkow, Professor of Medical Microbiology at Stanford Medical School. There were six main sessions: biotechnology, chromosomal organization, secretion, transcription, cloning, and synthesis of sporulation associated products. These sessions were chaired by Drs. William Phillips, Frank E. Young, J. O. Lampen, Janice Pero, J. A. Hoch, and A. I. Aronson, respectively. In addition to the main sessions, topics that were covered in detail during the previous conference were included in three focus sessions: general genetics, phages, and spores. These sessions were chaired, respectively, by Drs. R. E. Yasbin, T. A. Trautner, and D. J. Tipper, who also summarized the proceedings in this volume. During the three-day conference, about 30 posters were presented.

The contributions to this volume reflect the impressive sophistication that has been achieved in various facets of Bacillus biology, especially in identification of promoters, cloning of foreign genes, and selection of expressed gene products. It is clear from the proceedings that the Bacilli will become the most useful organisms for biotechnological applications.

The articles in this volume were organized and prepared for publication by Ms. Marsha Shearer. Ms. JoAnn Katheiser helped with various aspects of the conference organization at Stanford.

Contents

Session II: Secretion

Session III: Transcription

Session IV: Cloning

此为试读,需要完整PDF请访问: www.ertongbook.com