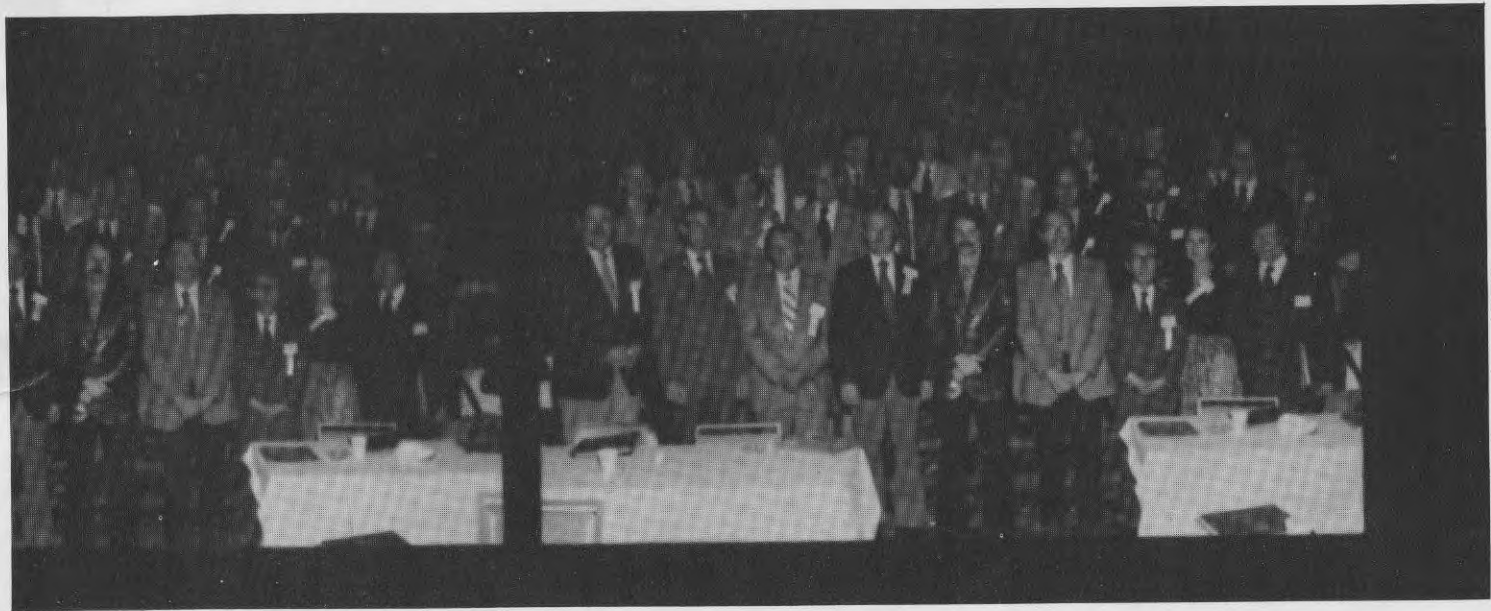


Mechanisms of Growth Control



Courtesy of the Office of Public Relations, State University of New York, Upstate Medical Center.

Mechanisms of Growth Control

Edited By

ROBERT O. BECKER, M.D.

Professor

Department of Orthopedic Surgery

State University of New York

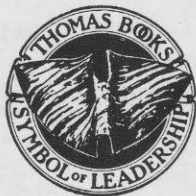
Upstate Medical Center

and

Chief of Orthopedic Surgery

Veterans Administration Medical Center

Syracuse, New York



CHARLES C THOMAS • PUBLISHER

Springfield • Illinois • U.S.A.

Published and Distributed Throughout the World by
CHARLES C THOMAS • PUBLISHER
Bannerstone House
301-327 East Lawrence Avenue, Springfield, Illinois, U.S.A.

This book is protected by copyright. No part of it
may be reproduced in any manner without written
permission from the publisher.

©1981, by CHARLES C THOMAS • PUBLISHER

ISBN 0-398-04469-4

Library of Congress Catalog Card Number: 80-39590

*With THOMAS BOOKS careful attention is given to all details of
manufacturing and design. It is the Publisher's desire to present books that are
satisfactory as to their physical qualities and artistic possibilities and
appropriate for their particular use. THOMAS BOOKS will be true to those
laws of quality that assure a good name and good will.*

Library of Congress Cataloging in Publication Data

Main entry under title:

Mechanisms of growth control.

Papers from a meeting held in Syracuse, N. Y.,
Sept. 26-28, 1979.

Bibliography: p.

Includes index.

1. Regeneration (Biology) — Congresses.
2. Growth — Congresses. 3. Biological control
systems — Congresses. I. Becker, Robert O.
[DNLM: 1. Regeneration. 2. Growth. QH 499
M486]

QP90.2.M43 591.3'1 80-39590

ISBN 0-398-04469-4

CONTRIBUTORS

Darrell Acree
Wenner-Gren Research Laboratory
University of Kentucky
Lexington, Kentucky

Ruben Adler
Department of Biology
School of Medicine
University of California, San Diego
La Jolla, California

David M. Bader
University of Michigan School of
Medicine
Ann Arbor, Michigan

Michael Baron
Department of Surgery
New York University School of
Medicine
New York, New York

Robert O. Becker, M.D.
Chief of Orthopedic Section
Veterans Administration Medical
Center
and Professor, Department of
Orthopedic Surgery
State University of New York Upstate
Medical Center
Syracuse, New York

Richard B. Borgens
Department of Biology
Yale University
New Haven, Connecticut

Lizabeth A. Bourrett
Departments of Orthodontics and
Oral Biology
University of Connecticut, School of
Dental Medicine
Farmington, Connecticut

Mark Braford
Georgetown University Medical
Center
Department of Anatomy
Washington, D.C.

Bruce M. Carlson
Departments of Anatomy and
Biological Sciences
University of Michigan Medical
School
Ann Arbor, Michigan

G. Cerf
Bioelectrochemistry Laboratory,
Orthopedic Research Laboratories
Departments of Chemical
Engineering and Applied
Chemistry and Orthopedic Surgery
Columbia University
New York, New York

P. Christel
Bioelectrochemistry Laboratory,
Orthopedic Research Laboratories
Departments of Chemical
Engineering and Applied
Chemistry and Orthopedic Surgery
Columbia University
New York, New York

James M. Cullen, Ph.D.
Research Anatomist
Veterans Administration Medical
Center
Syracuse, New York

Allan E. Dumont, M.D.
Jules Leonard Whitehill
Professor of Surgery
Department of Surgery
New York University School of
Medicine
New York, New York

Margaret Egar
 Department of Anatomy
 School of Medicine
 Case Western Reserve University
 Cleveland, Ohio

Eiichi Fukada
 The Institute of Physical and
 Chemical Research
 Wako-shi, Saitama, Japan

Richard J. Goss
 Division of Biology and Medicine
 Brown University
 Providence, Rhode Island

Henny Iliescu, M.S.
 Department of Surgery
 New York University School of
 Medicine
 New York, New York

Laura G. Jasch
 Department of Anatomy, Faculty of
 Medicine
 The University of British Columbia
 Vancouver, British Columbia, Canada

James F. Lafferty
 Wenner-Gren Research Laboratory
 University of Kentucky
 Lexington, Kentucky

Richard M. Libbin
 Veterans Administration Medical
 Center
 Brooklyn, New York

Amalia B. Martelli, B.A.
 Department of Surgery
 New York University School of
 Medicine
 New York, New York

Timothy M. McDonnell
 Department of Anatomy
 University of North Dakota School of
 Medicine
 Grand Forks, North Dakota

Lawrence Mononen, Ph.D.

Section on Applied Research in
 Neurosurgery
 N.I.N.C.D.S.
 National Institutes of Health
 Bethesda, Maryland

Louis A. Norton
 Departments of Orthodontics and
 Oral Biology
 University of Connecticut, School of
 Medicine

Farmington, Connecticut

Jean C. Oberpriller
 Department of Anatomy
 University of North Dakota School of
 Medicine

Grand Forks, North Dakota

John O. Oberpriller, Ph.D.
 Department of Anatomy
 University of North Dakota School of
 Medicine

Grand Forks, North Dakota

Ayub K. Ommaya, M.D., F.R.C.S.
 George Washington University
 Medical Center

Department of Neurosurgery
 Washington, D.C.

Philip Person
 Veterans Administration Medical
 Center
 Brooklyn, New York

Delbert E. Philpott
 Ames Research Center
 National Aeronautics and Space
 Administration
 Moffett Field, California

Arthur A. Pilla
 Bioelectrochemistry Laboratory
 Orthopedic Research Laboratories
 College of Physicians and Surgeons
 and Department of Applied
 Chemistry and Chemical
 Engineering
 Columbia University
 New York, New York

A. H. Reddi
 Laboratory of Biological Structure
 National Institute of Dental Research
 National Institutes of Health
 Bethesda, Maryland

Don Rigamonti, Ph.D.
 Georgetown University Medical
 Center
 Department of Anatomy
 Washington, D.C.

Gideon A. Rodan
 Departments of Orthodontics and
 Oral Biology
 University of Connecticut, School of
 Dental Medicine
 Farmington, Connecticut

Pavel P. Romyantsev ✓
 Laboratory of Cell Morphology
 Institute of Cytology of the Academy
 of Sciences of the USSR
 Leningrad, Union of Soviet Socialist
 Republics

Anthony J. Schmidt, Ph.D.
 Department of Anatomy
 Rush College of Medicine and
 College of Health Sciences
 Chicago, Illinois

David J. Simmons
 Department of Surgery
 Divisions of Orthopedic Surgery and
 Bone and Mineral Metabolism
 Washington University, School of
 Medicine
 St. Louis, Missouri

Marcus Singer
 Department of Anatomy
 Case Western Reserve University,
 School of Medicine
 Cleveland, Ohio

Betty F. Sicken
 Wenner-Gren Research Laboratory
 University of Kentucky
 Lexington, Kentucky

Stephen D. Skaper
 Department of Biology
 School of Medicine
 University of California, San Diego
 La Jolla, California

Stephen D. Smith, Ph.D.
 Department of Anatomy
 Wenner-Gren Research Laboratory
 University of Kentucky, College of
 Medicine
 Lexington, Kentucky

Marshall R. Urist, M.D.
 Bone Research Laboratory
 University of California, Los Angeles,
 Medical School
 Los Angeles, California

Silvio Varon, M.D.
 Department of Biology
 School of Medicine
 University of California, San Diego
 La Jolla, California

Carrie L. Walters, M.D.
 Section of Neurosurgery
 The University of Vermont College
 of Medicine
 Burlington, Vermont