

Ciba Foundation Symposium 211

TELOMERES AND TELOMERASE

and educational
published in 1947 by
CIBA Limited — now
independently in London

international cooperation
organizes about
one year on topics
of research
in the Ciba
Foundation holds many
workshops always

on W1N 4BN,
a Resource
scientific and
open to any
information on
for general
scientists from
working visits

1997

JOHN WILEY & SONS

Chichester · New York · Weinheim · Brisbane · Toronto · Singapore

E 16 c / 48

Copyright © Ciba Foundation 1997
Published in 1997 by John Wiley & Sons Ltd,
Baffins Lane, Chichester,
West Sussex PO19 1UD, England



National 01243 779777
International (+44) 1243 779777
e-mail (for orders and customer service enquiries): cs-books@wiley.co.uk
Visit our Home Page on <http://www.wiley.co.uk>
or <http://www.wiley.com>

98/058

All Rights Reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except under the terms of the Copyright, Designs and Patents Act 1988 or under the terms of a licence issued by the Copyright Licensing Agency, 90 Tottenham Court Road, London, UK W1P 9HE, without the permission in writing of the publisher.

Other Wiley Editorial Offices

John Wiley & Sons, Inc., 605 Third Avenue,
New York, NY 10158-0012, USA

WILEY-VCH Verlag GmbH, Pappelallee 3,
D-69469 Weinheim, Germany

Jacaranda Wiley Ltd, 33 Park Road, Milton,
Queensland 4064, Australia

John Wiley & Sons (Canada) Ltd, 22 Worcester Road,
Rexdale, Ontario M9W 1L1, Canada

John Wiley & Sons (Asia) Pte Ltd, 2 Clementi Loop #02-01,
Jin Xing Distripark, Singapore 129809

Ciba Foundation Symposium 211
ix+238 pages, 43 figures, 8 tables

Library of Congress Cataloging-in-Publication Data

Telomeres and telomerase/[editors, Derek J. Chadwick and Gail
Cardew].

p. cm.—(Ciba Foundation symposium; 211)
Symposium held at Ciba Foundation on 25–27 February 1997.
Includes bibliographical references and index.
ISBN 0-471-97278-9 (hbk : alk. paper)

1. Telomere—Congresses. 2. Telomerase—Congresses.

I. Chadwick, Derek. II. Cardew, Gail. III. Series.

QH600.3.T455 1997

97-41703

572.87—dc21

CIP

British Library Cataloguing in Publication Data

A catalogue record for this book is available from the British Library

ISBN 0 471 97278 9

Typeset in 10½ on 12½ pt Garamond by Dobbie Typesetting Limited, Tavistock, Devon
Printed and bound in Great Britain by Biddles Ltd, Guildford and King's Lynn.
This book is printed on acid-free paper responsibly manufactured from sustainable forestry,
in which at least two trees are planted for each one used for paper production.

E 16 c/48



98/058

Service enquiries: cs-books@wiley.co.uk
www.wiley.co.uk
www.wiley.com

be reproduced, stored in a retrieval
electronic, mechanical, photocopying,
rights of the Copyright, Designs and
Patents Act 1988 by the Copyright Licensing Agency,
without the permission in writing

#02-01,

k and Gail

February 1997.

resses.

es.
97-41703
CIP

British Library

setting Limited, Tavistock, Devon
Guildford and King's Lynn.
Manufactured from sustainable forestry,
certified for paper production.

Contents

Symposium on Telomeres and telomerase, held at the Ciba Foundation on 25–27 February 1997

This symposium is based on a proposal made by Sydney Shall

Editors and organizers: Derek J. Chadwick and Gail Cardew

- S. Brenner** Introduction 1
- E. Blackburn, A. Bhattacharyya, D. Gilley, K. Kirk, A. Krauskopf, M. McEachern, J. Prescott and T. Ware** The telomere and telomerase: how do they interact? 2
Discussion 15
- T. R. Cech and J. Lingner** Telomerase and the chromosome end replication problem 20
Discussion 28
- General discussion I** 35
- T. R. Hughes, D. K. Morris, A. Salinger, N. Walcott, C. I. Nugent and V. Lundblad** The role of the *EST* genes in yeast telomere replication 41
Discussion 47
- H. Biessmann, M. F. Walter and J. M. Mason** *Drosophila* telomere elongation 53
Discussion 67
- General discussion II** Recombination mechanisms of telomere maintenance 71
- S. Marcand, D. Wotton, E. Gilson and D. Shore** Rap1p and telomere length regulation in yeast 76
Discussion 93
- L. Guarente** Chromatin and ageing in yeast and in mammals 104
Discussion 107
- S. Shall** The limited reproductive life span of normal human cells in culture 112
Discussion 124

- C. B. Harley** Human ageing and telomeres 129
Discussion 139
- General discussion III** Are telomeres correlative or causative in cellular senescence? 145
- J. W. Shay, H. Werbin and W. E. Wright** Telomerase assays in the diagnosis and prognosis of cancer 148
Discussion 155
- M. A. Blasco, H. -W. Lee, M. Rizen, D. Hanahan, R. DePinho and C. W. Greider** Mouse models for the study of telomerase 160
Discussion 170
- R. F. Newbold** Genetic control of telomerase and replicative senescence in human and rodent cells 177
Discussion 189
- T. Lindahl, D. E. Barnes, A. Klungland, V. J. Mackenney and P. Schär** Repair and processing events at DNA ends 198
Discussion 205
- P. M. Lansdorp, S. Poon, E. Chavez, V. Dragowska, M. Zijlmans, T. Bryan, R. Reddel, M. Egholm, S. Bacchetti and U. Martens** Telomeres in the haemopoietic system 209
Discussion 219
- Final general discussion** Telomeres and telomerase in other organisms 223
- S. Brenner** Summary 227
- Index of contributors** 229
- Subject index** 231