# Genetical Research

EDITORIAL BOARD NICK H. BARTON ARTHUR CHOVNICK PIERRE COUBLE ELIZABETH DENNIS TIM HELENTJARIS WILLIAM G. HILL BRUCE W. HOLLOWAY PHILIP W. INGHAM DAVID ISH-HOROWICZ ALEC J. JEFFREYS MARY F. LYON ANNE MCLAREN MARK VAN MONTAGU OLIVER E. NELSON ROLF NÖTHIGER RALPH RILEY FRANCESCO SALAMINI PAUL M. SHARP NEIL S. WILLETTS

EXECUTIVE EDITORS ERIC C. R. REEVE DAVID J. FINNEGAN TRUDY F. C. MACKAY

Volume 66 1995



Published by The Press Syndicate of the University of Cambridge

The Pitt Building, Trumpington Street, Cambridge CB2 1RP 40 West 20th Street, New York, NY 10011–4211 10 Stamford Road, Oakleigh, Melbourne 3166, Australia

© Cambridge University Press, 1995

Printed in Great Britain by the University Press, Cambridge

### Contents

#### No. 1 (August 1995)

PROMBOON, AMORNRAT; SHIMADA, TORU; FUJIWARA, HARUHIKO and KOBAYASHI,	
MASAHIKO. Linkage map of random amplified polymorphic DNAs (RAPDs) in the	
silkworm, Bombyx mori	1
RONALDSON, ELAINE and BOWNES, MARY. Two independent cis-acting elements regulate	
the sex- and tissue-specific expression of yp3 in Drosophila melanogaster	9
HEATH, S. C.; BULFIELD, G.; THOMPSON, R. and KEIGHTLEY, P. D. Rates of change of	
genetic parameters of body weight in selected mouse lines	19
HOLMES, INGRID S. and HASTINGS, IAN M. Behavioural changes as a correlated response to	
selection	27
EVERETT, C. A. and SEARLE, J. B. Pattern and frequency of nocodazole induced meiotic nondisjunction in oocytes of mice carrying the 'tobacco mouse' metacentric	
R(16.17)7Bnr	35
KAY, SIMON J. E. and KEIGHTLEY, PETER D. Low rates of proviral integration in	
SWR/J-RF/J hybrid mice	45
KONDRASHOV, ALEXEY S. Modifiers of mutation-selection balance: general approach and	
the evolution of mutation rates	53
RUANE, J. and COLLEAU, J. J. Marker assisted selection for genetic improvement of animal populations when a single QTL is marked	71
BERGMAN, AVIV; GOLDSTEIN, DAVID B.; HOLINGER, KENT E. and FELDMAN, MARCUS W.	
Population structure, fitness surfaces, and linkage in the shifting balance process	85
BOOKS RECEIVED	93

#### No. 2 (October 1995)

FRANKHAM, RICHARD. Effective population size/adult population size ratios in wildlife: a review	95
SHI, JINRUI; HECKEL, DAVID G. and GOLDSMITH, MARIAN R. A genetic linkage map for the domesticated silkworm, Bombyx mori, based on restriction fragment length	
polymorphisms	109
SAPONARO, C.; POGNA, N. E.; CASTAGNA, R.; PASQUINI, M.; CACCIATORI, P. and	
REDAELLI, R. Allelic variation at the Gli- $A1^m$ , Gli- $A2^m$ and Glu- $A1^m$ loci and	
breadmaking quality in diploid wheat Triticum monococcum	127
PASTEUR, NICOLE; MARQUINE, MAITÉ; ROUSSET, FRANÇOIS; FAILLOUX, ANNA-BELLA; CHEVILLON, CHRISTINE and RAYMOND, MICHEL. The role of passive migration in the	
dispersal of resistance genes in Culex pipiens quinquefasciatus within French Polynesia	139
CHEVILLON, CHRISTINE; ERITJA, ROGER; PASTEUR, NICOLE and RAYMOND, MICHEL. Commensalism, adaptation and gene flow: mosquitoes of the <i>Culex pipiens</i> complex in	
different habitats	147
NUZHDIN, SERGEY V. The distribution of transposable elements on X chromosomes from a natural population of <i>Drosophila simulans</i>	159
LUSH, I. E.; HORNIGOLD, N.; KING, P. and STOYE, J. P. The genetics of tasting in mice VII. Glycine revisited, and the chromosomal location of Sac and Soa	167
SHORT PAPER	
LENGELING, ANDREAS; GRONEMEIER, MONIKA; RONSIEK, MELANIE; THIEMANN, ASTRID; JENTSCH, THOMAS J. and JOCKUSCH, HARALD. Chloride channel 2 gene	
( <i>Clc2</i> ) maps to chromosome 16 of the mouse, extending a region of conserved synteny with human chromosome $3q$	175

BOOK REVIEWS	93
Population Genetics, Molecular Evolution and the Neutral Theory. Selected papers of	
Motoo Kimura. Edited by Naoyuki Takahata. MARK KIRKPATRICK	179
Arabidopsis. Edited by Elliot M. Mayerowitz and Chris R. Somerville. ERIC REEVE	180
Domestication of Plants in the Old World. By Daniel Zohary and Maria Hopf. ERIC	
REEVE	181
Molecular Biology: Current Innovations and Future Trends. Edited by Annette M.	
Griffin and Hugh G. Griffin. JOHN MAULE	183
Manipulating the Mouse Embryo. A Laboratory Manual, 2nd Edition. By Brigid	
Hogan, Rosa Beddington, Frank Costantini and Elizabeth Lacy. JOHN WEST	184
Cellular Receptors for Animal Viruses. Edited by Eckard Wimmer. J. F. PEUTHERER	184
BOOKS RECEIVED	187

#### No. 3 (December 1995)

EDITORIAL	1
JOHNSON, LINDA R.; PILDER, STEPHEN H. and OLDS-CLARKE, PATRICIA. The cellular basis for interaction of sterility factors in the mouse t haplotype	189
MCLAREN, ANNE; MOLLAND, PAUL and SIGNER, ESTHER. Does monozygotic twinning	
occur in mice?	195
CERIOLI, SERGIO; BALLARINI, STEFANIA; UHRIG, HELMUT; SCALZOTTO, EUGENIO and	
MAROCCO, ADRIANO. Tagging of the temperature-sensitive Virescent-1 gene of maize	
using the transposable element Dissociation	203
CABALLERO, ARMANDO and SANTIAGO, ENRIQUE. Response to selection from new	
mutation and effective size of partially inbred populations. I. Theoretical results	213
MERCHANTE, MONTSERRAT; CABALLERO, ARMANDO and LÓPEZ-FANJUL, CARLOS.	
Response to selection from new mutation and effective size of partially inbred	
populations. II. Experiments with Drosophila melanogaster	227
GESSLER, DAMIAN D. G. The constraints of finite size in asexual populations and the rate of	
the ratchet	241
WHITTAKER, J. C.; CURNOW, R. N.; HALEY, C. S. and THOMPSON, R. Using marker-maps	
in marker-assisted selection	255
TAJIMA, FUMIO. Effect of non-random sampling on the estimation of parameters in	
population genetics	267
BOOK REVIEWS	
Patenting of Human Genes and Living Organisms. Edited by Friedrich Vogel and	
Reinhard Grunwald. GRAHAME BULFIELD	277
The Encyclopedia of Molecular Biology. Edited by Sir John Kendrew. ERIC REEVE	278
Epigenetic Inheritance and Evolution: The Lamarckian Dimension. By Eva Jablonka	
and Marion J. Lamb. JAMES SANG	279
BOOKS RECEIVED	283
INDEX	285

### CAMBRIDGE

- Annals of Human Genetics
- The British Journal of Nutrition
- Cambridge Quarterly of Healthcare Ethics
- Developmental Medicine and Child Neurology
- Epidemiology and Infection
- Experimental Physiology
- Fetal & Maternal Medicine Review
- Genetical Research
- International Journal of Technology Assessment in Healthcare
- Journal of Anatomy
- Journal of Physiology
- The Proceedings of the Nutrition Society
- Protein Science
- Psychological Medicine
- Quarterly Reviews of Biophysics
- RNA
- Visual Neuroscience
- Zygote

## Leading medical journals...

For well over a hundred years Cambridge University Press has been publishing internationally renowned research periodicals in the field of medicine and healthcare which have established themselves at the cutting edge of scientific research.

#### Coverage

They have a wide subject area coverage, from the long established and internationally respected Journal of Physiology and Journal of Anatomy to the newly developing areas of ethics, health economics and technology assessment covered by Cambridge Quarterly of Healthcare Ethics and International Journal of Technology Assessment in Healthcare.

#### Features

Fast publication times • Extensive book review sections • Occasional special issues and supplements in topical areas • No page charges for authors • Very high quality scientific papers • Peer-review • Highest editorial and production standards • Outstanding indexing services • Abstracted and indexed by leading bodies
 • colour illustration where required • high impact factors and cited half-lives

Illustration taken from P. R. Stanfield, N. W. Davies, P. A. Shelton, M. J. Sutcliffe, I. A. Khan, W. J. Brammar and E. C. Conley, A single aspartate residue is involved in both intrinsic gating and blockage by Mg<sup>2+</sup> or the inward rectifier, IRK1, Journal of Physiology, Vol 478, p5.

## Further information

Please send me more informa-

Please send the most recent medical books catalogue

Name\_\_\_\_\_ Address\_\_\_\_\_ Send to: Journals Marketing Department, Cambridge University Press, FREEPOST\*, The Edinburgh Building, Cambridge, CB2 IBR, UK. Tel: +44 (0) 1223 325806 Fax: +44 (0) 1223 315052 Email: journals\_marketing@ cup.cam.ac.uk

In North America write to: Cambridge University Press, 40 West 20th Street, New York, NY 1001I-42II, USA

CAMBRIDGE

UNIVERSITY PRESS

https://doi.org/10.1017/S0016672300034613 Published online by Cambridge University Press

## **Exploring New Frontiers in the Life Sciences**

#### **Protein Science**

Published for the Protein Society. Protein Science is dedicated to the exploration of all scientific aspects of protein molecules, the 'building blocks of life'. Appearing monthly this innovative journal presents research by leading scientists, encompassing many research settings and methodologies, and cutting across restrictive disciplinary lines. The wide scope of Protein Science includes the structure. function and biochemical significance of proteins, their role in molecular and cell biology, genetics and evolution, as well as their regulation and mechanism of action.

#### **Electronic Protein Science**

As a leading innovator in scientific publishing technologies, Protein Science, now publishing Volume 5, is continually enhancing its electronic dimension. For 1996, it will have on-line text and graphics, providing faster publication and greater access to original proteins research.

Members of The Protein Society have access to the 1996 electronic edition without additional charge.

#### Features

- Full length original research papers & shorter contributions
- On the Record concise reports of recent developments
- Recollective series significant discoveries & how they influenced the subsequent course of scientific pursuits are recalled
- Rapid publications
- Lists of forthcoming papers
- Corporate members news
- Calendars of meetings

#### **Subscription Information**

Volume 5, 1996 monthly with 12 diskettes: £415/\$705; £125/\$195 for individuals. Subscription price includes airmail/airspeeded delivery. All members of The Protein Society will receive **Protein Science** as part of their membership.

For information via the Internet contact: httpp://www.prosci.uci.edu For further information or a free sample copy, write to: Journals Marketing Department, Cambridge University Press, The Edinburgh Building, \*FREEPOST, Cambridge, CBI 2BR, UK Td: +44 (0)1223 325806 Fax: +44 (0)1223 315052 Ernail: journals\_marketing@cup.cam.ac.uk

In USA, Canada & Mexico write to: Cambridge University Press, 40 West 20th Street, New York, NY 10011, USA



#### Announcing a major new monthly journal!



The Official Publication of The RNA Society

RNA, the official publication of the new RNA society, provides a rapid publication of significant original research in all areas of RNA structure and function in eukaryotic, prokaryotic and viral systems.

#### Editor

Timothy W. Nilsen, Case Western Reserve University

#### Associate Editors

Thomas R. Cech, University of Colorado Chris L. Greer, University of California, Irvine Christine Guthrie, University of California, San Francisco Robert M. Krug, Rutgers University Reinhard Lührmann, Philips University, Marburg Dino Moras, CNRS, Strasbourg James Ofengand, Roche Institute of Molecular Biology Nancy Standart, University of Cambridge Joan A. Steitz, Yale University Marvin Wickens, University of Wisconsin

#### **Editorial Board**

John N. Abelson, CalTech Sidney Altman, Yale Univ. Brenda L. Bass, Univ. of Utah Jean D. Beggs, Univ. of Edinburgh Marlene Belfort, New York State Dept. of Health Donald M. Crothers, Yale Univ. James E. Dahlberg, Univ. of Wisconsin Fritz Eckstein, Max-Planck Inst. Michael R. Green, Univ. of Massachusetts Richard B. Hallick, Univ. of Arizona Daniel Herschlag, Stanford Univ. Anita K. Hopper, Penn State Univ. Alain Jacquier, Inst. Pasteur, Paris Walter Keller, Univ. of Basel Karla Kirkegaard, Univ. of Colorado Adrian R. Krainer, Cold Spring Harbor Lab. Angus I. Lamond, EMBL, Heidelberg Tom Maniatis, Harvard Univ. James Manlay, Columbia Univ. Michael B. Mathews, Cold Spring Harbor Lab. Iain W. Mattaj, EMBL, Heidelberg William H. McClain, Univ. of Wisconsin

Francois Michel. CNRS, Gif-sur-Yvette Peter B. Moore, Yale Univ. Andrew Newman, MRC Lab. of Mol. Biol. Harry F. Noller, Univ. of California, Santa Cruz Norman R. Pace, Indiana Univ. Arthur Pardi, Univ. of Colorado Hugh D. Robertson, Cornell Univ. Michael Rosbash, Brandeis Univ. Phillip A. Sharp, MIT Aaron J. Shatkin, CABN, New lersev Yoshiro Shimura, Kyoto Univ. Robert H. Symons, Univ. of Adelaide Jack W. Szostak, Harvard Univ. Ignacio Tinoco, Ir., Univ. of California, Berkeley Glauco P. Tocchini-Valentini, CNR. Rome Olke Uhlenbeck, Univ. of Colorado Jonathan Warner, Albert Einstein Col. of Med. Alan Weiner, Yale Univ. Eric Westhof, CNRS, Strasbourg Jo Ann Wise, Case Western Reserve Univ. Michael Yarus, Univ. of Colorado

#### **Recent Articles Include...**

Poly (A) polymerases in the nucleus and cytoplasm of frog oocytes: Dynamic changes during oocyte maturation and early development Scott Ballantyne, Andrea Bilger, Jonas Astrom, Anders Virtanen, & Marvin Wickens

Interactions between the double-stranded RNA binding motif and RNA: Definition of the binding site for the interferon-induced protein kinase DAI (PKR) on adenovirus VA RNA *Paul A. Clarke & Michael B. Mathews* 

Self-assembly of a group I intron active site from its component tertiary structural domains *Jennifer A. Doudna & Thomas R. Cech* 

Translational control of maturation-protein synthesis in phage MS2: A role for the kinetics of RNA folding? *Herman Groeneveld, Karine Thimon,* & Jan van Duin

A mutation at the universally conserved position 529 in Escherichia coli 16S rRNA creates a functional but highly error-prone ribosome U.V. Santer, J. Cekleniak, S. Kansil, M. Santer, M. O'Connor, & A.E. Dahlberg

Crosslinking of an RNA hairpin to the human U1A N-terminal RNA binding domain W. Tom Stump & Kathleen B. Hall

Intrinsic U2AF binding is modulated by exon enhancer signals in parallel with changes in splicing activity *Zhihuan Wang, Heidi M. Hoffmann, & Paula J. Grabowski* 

U6 snRNA function in nuclear pre-mRNA splicing: A phosphorophioate interference analysis of the U6 phosphate backbone Yi-Tao Yu, Patricia A. Maroney, Edward Darzynkiewicz, & Timothy W. Nilsen

#### **Subscriptions**

RNA Volume 2, 1996 ISSN 1355-8382: Non-member individuals \$180/ £168; Institutions \$360/£288

All members of The RNA Society will receive the journal as part of membership. Membership rates: regular members \$94, students \$47.

For additional information and membership application, contact: The RNA Society, 9650 Rockville Pike, Bethesda, MD 20814-3998, USA, Tel: 301-530-7120 Fax: 301-530-7049

For further information on manuscript submission contact RNA publication office at the first Cambridge University Press address given below or by fax (212) 645-5960, or by email: rna@cup.org<sup>.</sup>

In the United States, Canada and Mexico send orders to: Journals Department, Cambridge University Press, 40 West 20th Street, New York, NY 10011-4211, USA, fax +1 914 937 4712. email: journals\_marketing@cup.org

Outside North America, send orders to: Journals Department, Cambridge University Press, The Edinburgh Building, Cambridge CB2 2RU, UK, fax +44 [0]1223 325959, email: journals\_marketing@cup.cam.ac.uk



#### NOTES TO CONTRIBUTORS

GENETICAL RESEARCH publishes original work on all aspects of genetics, or in any field of research which has an important bearing on genetics. Reviews of topical interest will also be considered. Papers will be submitted to referees, and will generally be printed in order of acceptance. Short papers (see below) will be given priority in publication.

CONTRIBUTIONS are welcomed from scientists of all nationalities but must be written in English. Papers should be sent to one of the Executive Editors (see addresses inside front cover), or to a member of the Editorial Board with a particular interest in that area of genetics. Submission of a paper will be taken to imply that it is unpublished and is not being considered for publication elsewhere. Papers should be as concise as clarity permits, and illustrations should be restricted to the *minimum needed*.

SHORT PAPERS This category is designed for concisely written reports of work for which rapid publication is considered desirable. Such papers will normally be published within three months of receipt in acceptable form. They should not exceed 4 pages of print in length, and should include a summary.

TYPESCRIPTS A top copy and two other copies should be submitted. The top copy should be typed with double-spacing on one side of good quality paper, leaving margins of about  $1\frac{1}{2}$  inches at the left-hand side and at the top and bottom of each sheet. Each copy should include a complete set of illustrations. The title should ordinarily identify the organism. The address of the laboratory at which the work was carried out will be printed with the authors' names at the head of the paper, and changes of address may be added in footnotes. A footnote to the title page should also give the name and address to whom reprint requests may be made. Sources of financial support should be included with other acknowledgements at the end of the text. The title page of the typescript should include a short title for running headlines (limited to 50 letters and spaces), and the name and address of the author (or his proxy) to whom the proofs are to be sent, under the heading: Proofs to be sent to ... Main headings should be typed in capitals and (except summary and references) numbered consecutively. Subheadings should be typed in lower case, and underlined except for those words and symbols which would be italicized in the text. Subheadings should be numbered (i), (ii), etc., within each main heading. Numeral 1 and letter el: if your typewriter uses one symbol for both, please make clear to the printer which is intended in formulae, gene symbols, etc.

SUMMARY The summary will be printed at the beginning of the paper. It should give a concise abstract of the significant content and conclusions of the paper, in a form suitable for abstracting journals to use, and should not exceed 250 words.

ILLUSTRATIONS The separate category of Plates no longer applies in the new format. All illustrations, including photographs, diagrams, graphs etc. are to be labelled consecutively Figure 1, 2... according to their relative positions in the text. Each figure should have a legend to be printed underneath it. Photographs should be supplied as unmounted glossy prints, with a sketch or separate set to show the arrangement required when several photographs are to form one figure. The names of the authors and the orientation of the figure should be indicated on the back of each photograph. *Diagrams* should be about twice the size of the printed figure, but not larger than  $12 \times 8$  inches, unless exceptionally complicated, and the thickness of lines and size of points should be determined accordingly. They may be submitted as glossy photographic prints or be drawn in indian ink on white Bristol-board, tracing linen or graph paper ruled in pale blue (but not other colours). The lettering on drawings should be lightly inserted *in soft pencil only*, so that the printer can put in the finished lettering. Legends to illustrations must be given on a separate sheet of paper. Each illustration must have the name of the author and figure number pencilled on the back.

TABLES Each table should be typed on a separate sheet of paper and its approximate position in the text indicated on the typescript. Each should be numbered and carry an appropriate title. The table should be designed, whenever possible, to be printed in the normal orientation of the text. The data should be grouped so as to make the use of rules unnecessary. Vertical rules, in particular, are expensive to print, and will only be included at the Editor's discretion. Table footnotes should ordinarily employ the symbols \*, †, ‡, §, ||, ¶, \*\*, etc., in that order.

SYMBOLS Gene and mathematical symbols should generally be printed in italics. Please underline those to be italicized when they appear in the text and tables. Bold letters add to printing costs and should only be used where they are necessary to avoid confusion. The author must assume responsibility for the accurate printing of complex mathematical formulae submitted in typewritten form, by differentiating between letters and numbers which are open to misinterpretation, and identifying all Greek, Hebrew and script letters by means of marginal notes at their first appearance. Note that Greek symbols cannot be italicized and that '+' as the symbol for a wild-type allele should not be italicized.

NOMENCLATURE Wherever possible, standardized nomenclature should be employed. The author should refer to the following publications for guidance: Novick *et al.* (*Bacteriological Reviews* **40**, 168–189) for plasmids; O'Brien (Ed.), *Genetic Maps* **6**, Cold Spring Harbor 1993, for recent information on most species and recent gene lists.

REFERENCES should follow the normal usage in the journal. In the list of references at the end of the paper, *both titles of articles and names of periodicals* should be written out in full.

**PROOFS** Two sets of single-sided page proofs, together with the typescript of each paper will be sent to the author. The printers' marked proof should be returned after correction to the Executive Editor, together with the typescript. Excessive alterations, other than corrections of printers' errors, may be disallowed or charged to the author. Corrections should be made using the symbols in British Standard 1219: 1958, or its shortened version B.S. 1219C: 1958.

OFFPRINTS Fifty offprints of each paper, or short paper, are provided free of charge. Additional offprints may be ordered in the form sent out with proofs, provided this is returned within fourteen days of receipt.

#### **Cambridge University Press**

The Pitt Building, Trumpington Street, Cambridge CB2 1RP 40 West 20th Street, New York, NY 10011-4211, USA 10 Stamford Road, Oakleigh, Melbourne 3166, Australia

Printed in Great Britain by the University Press, Cambridge

#### Volume 66 No 3 December 1995

Genetical Res., Camb.

## Genetical Research

#### Contents

i EDITORIAL

- **189** JOHNSON, LINDA R.; PILDER, STEPHEN H. and OLDS-CLARKE, PATRICIA. The cellular basis for interaction of sterility factors in the mouse *t* haplotype
- **195** MCLAREN, ANNE; MOLLAND, PAUL and SIGNER, ESTHER. Does monozygotic twinning occur in mice?
- **203** CERIOLI, SERGIO; BALLARINI, STEFANIA; UHRIG, HELMUT; SCALZOTTO, EUGENIO and MAROCCO, ADRIANO. Tagging of the temperature-sensitive *Virescent-1* gene of maize using the transposable element *Dissociation*
- 213 CABALLERO, ARMANDO and SANTIAGO, ENRIQUE. Response to selection from new mutation and effective size of partially inbred populations.
  I. Theoretical results
- 227 MERCHANTE, MONTSERRAT; CABALLERO, ARMANDO and LÓPEZ-FANJUL, CARLOS. Response to selection from new mutation and effective size of partially inbred populations. II. Experiments with *Drosophila melanogaster*
- 241 GESSLER, DAMIAN D. G. The constraints of finite size in asexual populations and the rate of the ratchet
- 255 WHITTAKER, J. C.; CURNOW, R. N.; HALEY, C. S. and THOMPSON, R. Using marker-maps in marker-assisted selection
- 267 TAJIMA, FUMIO. Effect of non-random sampling on the estimation of parameters in population genetics BOOK REVIEWS
- 277 Patenting of Human Genes and Living Organisms. Edited by Friedrich Vogel and Reinhard Grunwald. GRAHAME BULFIELD
   The Encyclopedia of Molecular Biology. Edited by Sir John Kendrew.
   ERIC REEVE
   Epigenetic Inheritance and Evolution: The Lamarckian Dimension. By Eva Jablonka and Marion J. Lamb. JAMES SANG
- 283 BOOKS RECEIVED

CAMBRIDGE

285 INDEX



https://doi.org/10.1017/S0016672300034613 Published online by Cambridge University Press