V.81 NO.Z1 1984
C.02 SEQ: F396Z0000
TI: PROCEEDINGS OF THE NATIONAL ACADEMY OF

NOVEMBER 1984 VOLUME 81 NUMBER 21



Proceedings OF THE National Academy of Sciences

OF THE UNITED STATES OF AMERICA



BIOLOGICAL SCIENCES





Proceedings of THE National Academy of Sciences

OF THE UNITED STATES OF AMERICA

Officers of the Academy Frank Press, President
James D. Ebert, Vice President
Bryce Crawford, Jr., Home Secretary
Walter A. Rosenblith, Foreign Secretary
Elkan R. Blout, Treasurer

Editorial Board of the Proceedings

ROBERT A. ALBERTY PAUL BERG JOHN R. BORCHERT RONALD BRESLOW PETER D. LAX DANIEL E. KOSHLAND, JR., Chairman ROBERT E. MARSHAK DANIEL NATHANS PETER H. RAVEN JOHN RODGERS NEVIN S. SCRIMSHAW

J. Edwin Seegmiller Robert L. Sinsheimer Solomon H. Snyder Frank H. Westheimer James B. Wyngaarden

Managing Editor: Frances R. Zwanzig Senior Associate Editor: Gary T. Cocks Associate Editor: Cay Butler Associate Editor: John M. Malloy Associate Editor: T. Pearson Associate Editor: Dorothy P. Smith Assistant Managing Editor: Joanne D'Amico

Senior Production Editor: LYNN A. BROWN

Production Editors: BARBARA A. BACON, RUTH E. CROSSGROVE, P. J. GROFF,

PEGGY LEONARD, MICHAEL W. NEFF, JANET L. OVERTON,

ERIC R. WASSYNG

Administrative Assistants: Delores Banks, Beulah Edwards Manuscript Coordinators: Jacqueline Bode, Cyndy Mathews

Circulation: JULIA LITTLE, VIRGINIA TREADWAY

Editorial correspondence: PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, 2101 Constitution Avenue, Washington, DC 20418.

Business correspondence: Circulation Office of the Proceedings, National Academy of Sciences, 2101 Constitution Avenue, Washington, DC 20418.

Information for Contributors: See issue Number 1, January 1984.

Copyright: The National Academy of Sciences has copyrighted this journal as a collective work and does not own copyrights for individual articles. Requests for permission to reproduce parts of individual articles or for reprints of individual articles should be addressed to the authors. Microforms of complete volumes are available to regular subscribers only and may be obtained from University Microfilms, Xerox Corporation, Ann Arbor, MI 48103.

Subscriptions: All correspondence concerning subscriptions should be addressed to the Circulation Office of the Proceedings. Subscriptions are entered on a calendar year basis only. For 1985, subscription rates are as follows—in the United States: personal, \$185; institutional, \$215; elsewhere: personal, \$220; institutional, \$250. Subscribers are requested to notify the Circulation Office of the Proceedings 6 weeks in advance of any change of address; also the local postmaster. The Academy is not responsible for nonreceipt of issues because of an improper address unless a change of address is on file. The notice of address change should list both the old and new addresses. Claims for replacement copies will not be honored more than 60 days after the issue date for domestic subscribers and not more than 90 days after the issue date for foreign subscribers.

Back Issues: Volumes 76-81, January 1979 and thereafter, are available from the Circulation Office of the Proceedings. The price of a single issue is \$21.00 for Volumes 76-78 or \$11.00 for Volumes 79-81.

Second class postage paid at Washington, DC, and at additional mailing offices.

PRINTED IN THE USA

PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA (ISSN-0027-8424) is published semimonthly by THE NATIONAL ACADEMY OF SCIENCES, 2101 Constitution Avenue, Washington, DC 20418.

© 1984 by The National Academy of Sciences of the United States of America.

POSTMASTER: Send address changes to: PROCEEDINGS, 2101 Constitution Ave., Washington, DC 20418.



DEIZED EV 1031



Proceedings OF THE National Academy of Sciences

OF THE UNITED STATES OF AMERICA

November 1984

Volume 81, Number 21

pp. 6565-6908

Table of Contents

AUTHOR INDEX

Biological Sciences

BIOCHEMISTRY

Isolation of a large cholecystokinin precursor from canine brain	V. E. Eysselein, J. I Shively, C. Miller,
Identification and partial purification of the cardiac sodium-calcium exchange protein	Calvin C. Hale, Rob Diane C. Ahrens,
Specific in vitro adenylylation of the simian virus 40 large tumor antigen	Margaret K. Bradley Merceditas S. Villa M. Livingston
Stimulatory GTP regulatory unit N, and the catalytic unit of adenylate cyclase are tightly associated: Mechanistic consequences	Hadas Arad, Jürg P. Alexander Levitzk
Single amino acid substitutions influencing the folding pathway of the phage P22 tail spike endorhamnosidase	Myeong-Hee Yu and
Triplication of a four-gene set during evolution of the goat β -globin locus produced three genes now expressed differentially during development	Tim M. Townes, Mar Jerry B. Lingrel
Expression of human α_1 -antitrypsin cDNA in the yeast Saccharomyces cerevisiae	Teresa Cabezón, Mic Pascal Herion, Ros Alex Bollen
F-actin is intermolecularly crosslinked by N,N'-p-phenylenedimaleimide through lysine-191 and cysteine-374	Marshall Elzinga and
Amino acid sequence of bovine heart coupling factor 6	Ji-kang Fang, John W

V. E. Eysselein, J. R. Reeve, Jr., J. E. Shively, C. Miller, and J. H. Walsh	6565
Calvin C. Hale, Robert S. Slaughter, Diane C. Ahrens, and John P. Reeves	6569
Margaret K. Bradley, Janet Hudson, Merceditas S. Villanueva, and David M. Livingston	6574
Hadas Arad, Jürg P. Rosenbusch, and Alexander Levitzki	6579
Myeong-Hee Yu and Jonathan King	6584
Tim M. Townes, Mary C. Fitzgerald, and Jerry B. Lingrel	6589
Teresa Cabezón, Michel De Wilde, Pascal Herion, Rosette Loriau, and Alex Bollen	6594
Marshall Elzinga and James J. Phelan	6599
Ji-kang Fang, John W. Jacobs, Baruch I. Kanner, Efraim Racker, and Ralph A. Bradshaw	6603





Contents

Detection in vivo of a new gene product (gene III) of cauliflower mosaic virus	C. Xiong, G. Lebeurier, and L. Hirth	6608
Alkane biosynthesis by decarbonylation of aldehydes catalyzed by a particulate preparation from <i>Pisum sativum</i>	T. M. Cheesbrough and P. E. Kolattukudy	6613
DNA methylation and regulation of the human eta -globin-like genes in mouse erythroleukemia cells containing human chromosome 11	Timothy J. Ley, Yawen L. Chiang, Donna Haidaris, Nicholas P. Anagnou, Vincent L. Wilson, and W. French Anderson	6618
Monomeric solubilized sarcoplasmic reticulum Ca pump protein: Demonstration of Ca binding and dissociation coupled to ATP hydrolysis	Dwight W. Martin, Charles Tanford, and Jacqueline A. Reynolds	6623
Integration-specific retrovirus expression in embryonal carcinoma cells	Joe Sorge, Ann E. Cutting, Valerie D. Erdman, and James W. Gautsch	6627
Calcium-binding proteins in human carcinoma cell lines	Gaby E. Pfyffer, Gisela Haemmerli, and Claus W. Heizmann	6632
Transcriptional activation of the rat liver tyrosine aminotransferase gene by cAMP	Setsuko Hashimoto, Wolfgang Schmid, and Günther Schütz	6637
Characterization of the genes specifying two metacyclic variable antigen types in Trypanosoma brucei rhodesiense	Michael J. Lenardo, Allison C. Rice- Ficht, Gregory Kelly, Klaus M. Esser, and John E. Donelson	6642
Heat shock regulatory gene htpR influences rates of protein degradation and expression of the lon gene in Escherichia coli	Stephen A. Goff, Lawrence P. Casson, and Alfred L. Goldberg	6647
A viable simian virus 40 variant that carries a newly generated sequence reiteration in place of the normal duplicated enhancer element	Candace Swimmer and Thomas Shenk	6652
Nucleotide sequence of the 3' region of an infectious human T-cell leukemia virus type II genome	Kunitada Shimotohno, William Wachsman, Yuri Takahashi, David W. Golde, Masanao Miwa, Takashi Sugimura, and Irvin S. Y. Chen	6657
Enzymes processing somatostatin precursors: An Arg-Lys esteropeptidase from the rat brain cortex converting somatostatin-28 into somatostatin-14	Pablo Gluschankof, Alain Morel, Sophie Gomez, Pierre Nicolas, Christine Fahy, and Paul Cohen	6662
Genomic structure and possible retroviral origin of the chicken CR1 repetitive DNA sequence family	William E. Stumph, Clague P. Hodgson, Ming-Jer Tsai, and Bert W. O'Malley	6667
A purified fraction containing RNA polymerase I that can accurately transcribe rat ribosomal RNA gene	Rabinder N. Kurl, Lawrence I. Rothblum, and Samson T. Jacob	6672
Identification of the tyrosine protein kinase from LSTRA cells by use of site- specific antibodies	John E. Casnellie, Larry E. Gentry, Larry R. Rohrschneider, and Edwin G. Krebs	6676
Characterization of nerve growth factor receptor in neural crest tumors using monoclonal antibodies	Alonzo H. Ross, Peter Grob, Mark Bothwell, David E. Elder, Carolyn S. Ernst, Nadia Marano, Barbara F. D. Ghrist, Catherine C. Slemp, Meenhard Herlyn, Barbara Atkinson, and Hilary Koprowski	6681
Functional alteration of the β -adrenergic receptor during desensitization of mammalian adenylate cyclase by β -agonists	Shouki Kassis and Peter H. Fishman	6686
Heat-labile alkaline phosphatase from Antarctic bacteria: Rapid 5' end-labeling of nucleic acids	Hiromi Kobori, Cornelius W. Sullivan, and Hiroaki Shizuya	6691
Evidence that a major class of mouse endogenous long terminal repeats (LTRs) resulted from recombination between exogenous retroviral LTRs and LTR-like elements (LTR-IS)	Martin Schmidt, Klaus Glöggler, Thomas Wirth, and Ivan Horak	669 <i>6</i>
Synthesis and glycosylation of the common α subunit of human glycoprotein hormones in mouse cells	T. V. Ramabhadran, B. A. Reitz, and D. C. Tiemeier	670
Fusion protein of the paramyxovirus simian virus 5: Nucleotide sequence of mRNA predicts a highly hydrophobic glycoprotein	Reay G. Paterson, Timothy J. R. Harris, and Robert A. Lamb	6706
Subcellular distribution of DNA-binding and non-DNA-binding 1,25-dihydroxyvitamin D receptors in chicken intestine	Masaki Nakada, Robert U. Simpson, and Hector F. DeLuca	671
A dual role for the Ca ²⁺ -requiring proteinase in the degradation of hemoglobin by erythrocyte membrane proteinases	S. Pontremoli, E. Melloni, B. Sparatore, M. Michetti, and B. L. Horecker	671



Contents

CELL BIOLOGY

-	ic GMP may serve as a second messenger in peptide-induced muscle egeneration in an insect	Lawrence M. Schwartz and James W. Truman	6718
	-affinity binding of the regulatory subunit $(R_{\rm II})$ of cAMP-dependent protein inase to microtubule-associated and other cellular proteins	Suzanne M. Lohmann, Pietro DeCamilli, Inge Einig, and Ulrich Walter	6723
	ductory analysis of the GTP-cap phase-change kinetics at the end of a nicrotubule	Terrell L. Hill	6728
Tran	scriptional induction of two genes in human cells by β interferon	A. C. Larner, G. Jonak, YS. E. Cheng, B. Korant, E. Knight, and J. E. Darnell, Jr.	6733
	et polypeptide of a carcinogen is associated with normal mitosis and arcinogen-induced hyperplasias in adult hepatocytes	R. Philip Custer and Sam Sorof	6738
(Pro)	insulin associates with Golgi membranes of pancreatic B cells	L. Orci, M. Ravazzola, and A. Perrelet	6743
The	translational mobility of substances within the cytoplasmic matrix	Ken Jacobson and John Wojcieszyn	6747
	erentiation of human erythroid cells is associated with increased 0-glycosylation of the major sialoglycoprotein, glycophorin A	Carl G. Gahmberg, Marja Ekblom, and Leif C. Andersson	6752
	iffic binding to cultured cells of 125 I-labeled type eta transforming growth actor from human platelets	Ronald F. Tucker, Earl L. Branum, Gary D. Shipley, Robert J. Ryan, and Harold L. Moses	6757
	pition of epidermal growth factor-induced mitogenesis by amiloride and an nalog: Evidence against a requirement for Na ⁺ /H ⁺ exchange	Jeffrey M. Besterman, Scott J. Tyrey, Edward J. Cragoe, Jr., and Pedro Cuatrecasas	6762
	ractions between human tumor cells and fibroblasts stimulate hyaluronate ynthesis	Warren Knudson, Chitra Biswas, and Bryan P. Toole	6767
Ехрі	ression of the sis gene by endothelial cells in culture and in vivo	Thomas B. Barrett, Corinne M. Gajdusek, Stephen M. Schwartz, James K. McDougall, and Earl P. Benditt	6772
Mov	ement of scallop myosin on Nitella actin filaments: Regulation by calcium	Ronald D. Vale, Andrew G. Szent- Gyorgyi, and Michael P. Sheetz	6775
GENE	TICS		
	ene regulating the heat shock response in Escherichia coli also affects proteolysis	Tania A. Baker, Alan D. Grossman, and Carol A. Gross	6779
	sup-7(st5) X gene of Caenorhabditis elegans encodes a $tRNA_{UAG}^{Trp}$ amber uppressor	Suzanne L. Bolten, Patricia Powell-Abel, David A. Fischhoff, and Robert H. Waterston	6784
	termination of transcription from an Escherichia coli ribosomal RNA promoter	William E. Holben and Edward A. Morgan	6789
Sequ	uences homologous to P elements occur in Drosophila paulistorum	Stephen B. Daniels, Linda D. Strausbaugh, Lee Ehrman, and Robert Armstrong	6794
	vation of a translocated c-myc gene: Role of structural alterations in the apstream region	Klas G. Wiman, Bayard Clarkson, Adrian C. Hayday, Haruo Saito, Susumu Tonegawa, and William S. Hayward	6798
Hea h	t shock regulatory gene (htpR) of Escherichia coli is required for growth at high temperature but is dispensable at low temperature	Takashi Yura, Toru Tobe, Koreaki Ito, and Toshio Osawa	6803
Vira	l integration near c-myc in 10-20% of MCF 247-induced AKR lymphomas	Yen Li, Christie A. Holland, Janet W. Hartley, and Nancy Hopkins	6808
	ectional cloning of DNA fragments at a large distance from an initial probe: A circularization method	Francis S. Collins and Sherman M. Weissman	6812
	ntaneous deletions and duplications of sequences in the genome of cowpox virus	David J. Pickup, Barbara S. Ink, Barbara L. Parsons, Wensi Hu, and Wolfgang K. Joklik	6817



DOCKET

Explore Litigation Insights



Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time** alerts and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.

