

K/S

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES
Volume 448

NEURONAL CHOLECYSTOKININ

Edited by Jean-Jacques Vanderhaeghen and Jacqueline N. Crawley



*The New York Academy of Sciences:
New York, New York
1985*

MAIA Exhibit 1008
MAIA V. BRACCO
IPR PETITION

Copyright © 1985 by The New York Academy of Sciences. All rights reserved. Under the provisions of the United States Copyright Act of 1976, individual readers of the Annals are permitted to make fair use of the material in them for teaching or research. Permission is granted to quote from the Annals provided that the customary acknowledgment is made of the source. Material in the Annals may be republished only by permission of The Academy. Address inquiries to the Executive Editor at The New York Academy of Sciences.

Copying fees: For each copy of an article made beyond the free copying permitted under Section 107 or 108 of the 1976 Copyright Act, a fee should be paid through the Copyright Clearance Center, 21 Congress Street, Salem, MA 01970. For articles more than 3 pages, the copying fee is \$1.75.

Cover: Autoradiographic localization of cholecystokinin receptors in rat forebrain by Pierrette Gaudreau, Notre Dame Hospital, Montreal, Canada. (Paperback volume only.)

Library of Congress Cataloging in Publication Data

Main entry under title:

Neuronal cholecystokinin.

(Annals of the New York Academy of Sciences, ISSN 077-8923; v. 448)

Based on the First International Conference on Neuronal Cholecystokinin, held in Brussels, Belgium, July 3-6, 1984, sponsored by the Queen Elisabeth Medical Foundation of Belgium and the New York Academy of Sciences.

Includes bibliographies and indexes.

1. Cholecystokinin—Physiological effect—Congresses. I. Vanderhaeghen, Jean-Jacques.
2. Neurons—Congresses. 3. Central nervous system—Congresses. II. Crawley, Jacqueline N. III. International Conference on Neuronal Cholecystokinin (1st : 1984 : Brussels, Belgium) IV. Fondation Médicale Reine Elisabeth. V. New York Academy of Sciences. VI. Series.
[DNLM: 1. Cholecystokinin—congresses. 2. Neurons—congresses. W1 AN626YI v. 448/WK 170 N494 1984] QP572.C5N48 1985 599'.0188 85-13756
ISBN 0-89766-290-3
ISBN 0-89766-291-1 (pbk.)

SP

Printed in the United States of America

ISBN 0-89766-290-3 (cloth)

ISBN 0-89766-291-1 (paper)

ISSN 077-8923

Biomed
WI
NESSY
V. 448
1985

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES

Volume 448

July 5, 1985

NEURONAL CHOLECYSTOKININ^a

Editors and Conference Organizers

JEAN-JACQUES VANDERHAEGHEN AND JACQUELINE N. CRAWLEY

CONTENTS

Preface. By JEAN-JACQUES VANDERHAEGHEN AND JACQUELINE N. CRAWLEY ...	xiii
Comparative Distribution of Cholecystokinin and Other Neuropeptides: Why is This Peptide Different from All Other Peptides? By JACQUELINE N. CRAWLEY	1

Part I. Neurochemistry

Molecular Forms of Cholecystokinin in the Nervous System. By MICHAEL J. BROWNSTEIN and JENS F. REHFELD.....	9
Molecular Forms of Cholecystokinin in the Brain and the Relationship to Neuronal Gastrins. By J. F. REHFELD, H. F. HANSEN, P. D. MARLEY, and K. STENGAARD-PEDERSEN.....	11
Studies on Brain Cholecystokinin in Different Species Using Sequence-specific Antisera. By J. B. M. J. JANSEN and C. B. H. W. LAMERS.....	24
Cholecystokinin and Gastrin Forms in the Nervous System. By G. J. DOCKRAY, H. DESMOND, R. J. GAYTON, A-C. JONSSON, H. RAYBOULD, K. A. SHARKEY, A. VARRO, and R. G. WILLIAMS.....	32
Neurochemistry of Cholecystokinin in Brain, Pituitary, and Cerebrospinal Fluid. By MARGERY C. BEINFELD and ANITA CIARLEGLIO.....	44

Part II. Synthesis and Metabolism

Modulation of Cholecystokinin Gene Expression. By ROBERT J. DESCHENES, RANDY S. HAUN, DAN SUNKEL, BERNARD A. ROOS, and JACK E. DIXON ...	53
Studies on the Conformation, Enzymatic Degradation, Pharmacological Potency, and Binding Properties in Brain Tissue of Cholecystokinin-8 and New Related Peptides. By B. P. ROQUES, C. DURIEUX, G. GACEL, D. PÉLAPRAT, M. RUIZ-GAYO, J. BELLENEY, E. FELLION, J. M. ZAJAC, M-C. FOURNIÉ-ZALUSKI, V. DAUGÉ, I. MENANT, P. ROSSIGNOL, B. LUX, D. GÉRARD, D. BÉGUÉ, A. SASAKI, and J. L. MORGAT	61
The Biosynthesis of Cholecystokinin in Neural Tissue. By NILS R. GOLTERMANN	76

^aThis volume is the result of a conference on Neuronal Cholecystokinin held by The New York Academy of Sciences and the Fondation Médicale Reine Elisabeth on July 3-6, 1984 in Brussels, Belgium.

ions of the
use of the
d that the
d only by
ademy of

107 or 108
ess Street,

Gaudreau,

Brussels,
ium and

m, Jean-

Enzymatic Degradation of Cholecystokinin in the Central Nervous System. <i>By</i> MONIQUE DESCHODT-LANCKMAN.....	87
Cholecystokinin in Intracerebral Transplants. <i>By</i> M. SCHULTZBERG.....	99
Sulfation and Desulfation of Cerebral Cholecystokinin. <i>By</i> FROYLAN VARGAS, OLIVIER FREROT, MI DAM TRUNG TUONG, KATHERINE ZUZEL, CHRISTIANE ROSE, and JEAN-CHARLES SCHWARTZ.....	110

Part III. Neuroanatomy

The Distribution and Some Connections of Cholecystokinin Neurons in the Rat Brain. <i>By</i> JAMES H. FALLON and KIM B. SEROOGY	121
Studies on Cholecystokinin-containing Neuronal Pathways in Rat Cerebral Cortex and Striatum. <i>By</i> D. K. MEYER and Z. PROTOPAPAS	133
Anatomical Studies of Cholecystokinin in Neurons and Pathways Involved in Neuroendocrine Regulation. <i>By</i> JOZSEF Z. KISS	144
Cholecystokinin in the Medial Parvocellular Subdivision of the Paraventricular Nucleus: Co-existence with Corticotropin-releasing Hormone. <i>By</i> E. MEZEY, T. D. REISINE, L. SKIRBOLL, M. BEINFELD, and J. Z. KISS.....	152
Cholecystokinin in the Retina of Vertebrates. <i>By</i> NEVILLE N. OSBORNE.....	157
Cholecystokinin in the Nervous Systems of Invertebrates and Protochordates: Immunohistochemical Localization of a Cholecystokinin-8-like Substance in Annelids and Insects. <i>By</i> N. DHAINAUT-COURTOIS, G. TRAMU, R. MARCEL, J. MALÉCHA, M. VERGER-BOCQUET, J. C. ANDRIÈS, M. MASSON, L. SELLOUM, G. BELEMTUGRI, and J. C. BEAUVILLAIN	167

Part IV. Receptors

Integrated Anatomical and Physiological Studies of Neuronal Cholecystokinin Receptors. <i>By</i> ROBERT B. INNIS and GEORGE K. AGHAJANIAN	188
Cholecystokinin Receptors in Mammalian Brain: A Comparative Characterization and Visualization. <i>By</i> PIERRETTE GAUDREAU, SERGE ST-PIERRE, CANDACE B. PERT, and RÉMI QUIRION	198
Brain Cholecystokinin Receptors: Binding Characteristics, Covalent Cross-linking, and Evolutionary Aspects. <i>By</i> JOHN A. WILLIAMS, STEVEN R. VIGNA, CHOITSU SAKAMOTO, and IRA D. GOLDFINE.....	220
Cholecystokinin Neuron Systems and Their Interactions with the Presynaptic Features of the Dopamine Neuron Systems: A Morphometric and Neurochemical Analysis Involving Studies on the Action of Cholecystokinin-8 and Cholecystokinin-58. <i>By</i> K. FUXE, L. F. AGNATI, J-J. VANDERHAEGHEN, K. TATEMOTO, K. ANDERSSON, P. ENEROTH, A. HÄRFSTRAND, G. VON EULER, R. TONI, M. GOLDSTEIN, and V. MUTT.....	231

Part V. Co-existence

Distribution of Cholecystokinin-like Immunoreactivity in the Nervous System: Co-existence with Classical Neurotransmitters and Other Neuropeptides. <i>By</i> T. HÖKFELT, L. SKIRBOLL, B. EVERITT, B. MEISTER, M. BROWNSTEIN, T. JACOBS, A. FADEN, S. KUGA, M. GOLDSTEIN, R. MARKSTEIN, G. DOCKRAY, and J. REHFELD	255
Electrophysiological Studies of the Role of Cholecystokinin in the Substantia Nigra and Its Interactions with Dopamine. <i>By</i> L. R. SKIRBOLL and D. W. HOMMER	275

System. By	87
.....	99
VARGAS,	110
.....	
s in the Rat	121
.....	
erebral	133
.....	
volved in	144
.....	
ventricular	
By E.	
ISS.....	152
INE.....	157
hordates:	
Substance	
U, R.	
M.	
IN.....	167
.....	
cystokinin	188
.....	
SERGE	198
.....	
S, STEVEN	220
.....	
esynaptic	
nd	
AGNATI,	
OTH, A.	
MUTT.....	231
.....	
is System:	
opeptides.	
OWNSTEIN,	
l, G.	
.....	255
stantia	
and D. W.	
.....	275

Cholecystokinin Potentiation of Dopamine-mediated Behaviors in the Nucleus Accumbens. By JACQUELINE N. CRAWLEY.....	283
<i>In Vivo</i> Sulfation of Cholecystokinin Octapeptide: Possible Interactions of the Two Forms of Cholecystokinin with Dopamine in the Brain. By B. PENKE, G. L. KOVÁCS, J. ZSIGÓ, T. KÁDÁR, G. SZABÓ, K. KOVÁCS, and G. TELEGDY.....	293
Distinct Properties of Cholecystokinin-8 and Mixed Dopamine- Cholecystokinin-8 Neurons Innervating the Nucleus Accumbens. By J. M. STUDLER, M. REIBAUD, G. TRAMU, G. BLANC, J. GLOWINSKI, and J. P. TASSIN.....	306
Evidence for Cholecystokinin-Dopamine Receptor Interactions in the Central Nervous System of the Adult and Old Rat: Studies on Their Functional Meaning. By L. F. AGNATI, K. FUXE, L. GIARDINO, L. CALZA, M. ZOLI, N. BATTISTINI, F. BENFENATI, J.-J. VANDERHAEGHEN, D. GUIDOLIN, M. RUGGERI, and M. GOLDSTEIN.....	315
Co-existence of Cholecystokinin- or Gastrin-like Peptides with Other Peptides in the Hypophysis and the Hypothalamus. By J.-J. VANDERHAEGHEN, S. GOLDMAN, F. LOTSTRA, O. VAN REETH, C. DESCHEPPER, J. ROSSIER, and S. SCHIFFMANN.....	334

Part VI. Neurophysiology

Further Studies on the Specificity of Proglumide as a Selective Cholecystokinin Antagonist in the Central Nervous System. By B. S. BUNNEY, L. A. CHIODO, and A. S. FREEMAN.....	345
Interactions of Cholecystokinin and Dopamine in the Nucleus Accumbens. By REX Y. WANG, FRANCIS J. WHITE, and MARK M. VOIGT.....	352
Cholecystokinin as a Potent Excitant of Neurons of the Dentate Gyrus of Rats. By PENNY A. BROOKS and JOHN S. KELLY.....	361
The Effects of Cholecystokinin-8 in the Nucleus Tractus Solitarius. By M. DENAVIT-SAUBIÉ, M. A. HURLÉ, M. P. MORIN-SURUN, A. S. FOUTZ, and J. CHAMPAGNAT.....	375
Actions of Cholecystokinin Octapeptide on Rat Spinal Dorsal Horn Neurons. By J. WILLETTS, L. URBAN, K. MURASE, and M. RANDIĆ.....	385
Cholecystokinin and Cultured Spinal Neurons: Immunohistochemistry, Receptor Binding, and Neurophysiology. By M. A. ROGAWSKI, M. C. BEINFELD, S. E. HAYS, T. HÖKFELT, and L. R. SKIRBOLL.....	403

Part VII. Behavior

Species Differences in the Response to Cholecystokinin. By JOHN E. MORLEY, ALLEN S. LEVINE, TIMOTHY J. BARTNESS, STEVEN E. NIZIELSKI, MICHAEL J. SHAW, and JOHN J. HUGHES.....	413
The Satiety Effect of Cholecystokinin: Recent Progress and Current Problems. By G. P. SMITH and J. GIBBS.....	417
Central Nervous System Cholecystokinin and the Control of Feeding. By CLIFTON A. BAILE and MARY ANNE DELLA-FERA.....	424
Satiety Effects of Cholecystokinin and Ceruletide in Lean and Obese Man. By GEORG STACHER.....	431

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.