THE IX INTERNATIONAL SYMPOSIUM
ON
OLFACTION AND TASTE
and
THE 8TH ANNUAL MEETING
OF THE
ASSOCIATION FOR
CHEMORECEPTION SCIENCES

July 20-24, 1986
SNOWMASS VILLAGE, COLORADO
THE IX INTERNATIONAL SYMPOSIUM ON OLFACITION AND TASTE (ISOT) AND THE 8TH ANNUAL MEETING OF THE ASSOCIATION FOR CHEMORECEPTION SCIENCES
July 20-24, 1986
Snowmass Village, Colorado

SUNDAY
July 20, 1986
4:00 p.m. to 5:00 p.m. REGISTRATION – Snowmass Conference Center
8:00 p.m. Lobby
5:00 p.m. Refreshments on Roof Garden
Barbeque Buffet
8:00 p.m. GIVAUDAN LECTURE – Hoaglund Room
“Molecular Mechanisms of Olfactory Receptors”
Dr. Solomon Snyder
Johns Hopkins School of Medicine, USA
Introduction by Dr. David V. Smith
Executive Chairman, Association for Chemoreception Sciences

MONDAY
July 21, 1986
7:30 a.m. Continental Breakfast – Snowmass Conference Center Lobby
8:30 a.m. SYMPOSIUM: “Where Do The Molecular Events of Chemosensory Transduction Take Place?” – Anderson Room
Chair by Dr. D. Lancot, Weizmann Institute
EVOLUTIONARY PATTERNS IN SENSORY RECEPTORS: AN EXERCISE IN ULTRASTRUCTURAL PALAEOENTOLOGY
Dr. David Moran
University of Colorado School of Medicine, USA
SENSORY TRANSDUCTION IN FLAGELLATE BACTERIA
Dr. Judith Armitage
University of Oxford, England
EUKARYOTIC UNICELLS: HOW USEFUL IN STUDYING CHEMORECEPTION?
Dr. J. Van Houten
University of Vermont, USA
Coffee, Tea Break
IONIC MECHANISM OF GENERATION OF RECEPTOR POTENTIAL IN FROG TASTE CELLS
Dr. Toshihide Sato
Nagasaki University, Japan
TOWARDS A COMPREHENSIVE ANALYSIS OF OLFACTORY TRANSDUCTION
Dr. Doron Lancot
Weizmann Institute of Science, Israel
DISCUSSION
12:00 noon Lunch Break
Box lunches are available to those who have pre-registered (see Course Application)
12:00 noon to 2:00 p.m. Executive Committee Meeting, Association for Chemoreception Sciences – (Lunch included)
12:30 p.m. FLY-FISHING DEMONSTRATION AND INSTRUCTIONS (See General Information and Course Application)
3:00 p.m. Volunteer Papers, Session IA – Kearns Room
Volunteer Papers, Session IB – Anderson Room
Volunteer Papers, Session IC – Max Park Room, Hotel Wildwood
6:30 p.m. Dinner Break.
8:30 p.m. Poster Session I – Hoaglund Room

TUESDAY
July 22, 1986
7:15 a.m. BREAKFAST WORKSHOPS (Separate registration
is required – see Course Application)
IA: ROUNDTABLE DISCUSSION – Plaza
A follow-up on the preceding day's symposium.
Panelists:
* Dr. Doron Lancet, Weizmann Institute of Science
Dr. David Moran, University of Colorado
Dr. Judith Armitage, University of Oxford
Dr. Judith Van Houten, University of Vermont
Dr. Toshihide Sato, Nagasaki University
IB: OVERVIEW OF TRIGEMINAL CHEMORECEPTION – Plaza
Panelists:
* Dr. Daniel Kurtz, R. J. Reynolds Tobacco Company
Dr. William Cain, John B. Pierce Foundation
Dr. Herbert Stone, Tragen Corporation
Dr. Yves Alarie, University of Pittsburgh
IC: TEMPORAL ASPECTS OF CHEMICAL STIMULI: NATURAL STIMULUS DISTRIBUTIONS, RECEPTOR CELL ADAPTATION AND BEHAVIORAL FUNCTION – Roof Garden
Dr. Jelle Atema, Marine Biological Laboratory
Dr. Karl-Ernst Kaisling, Max-Planck Institut für Verhaltensphysiologie
Dr. Robert Franx, University of Cincinnati
*Chairpersons
or,
7:30 a.m. Continental Breakfast – Conference Center Lobby
8:30 a.m. SYMPOSIUM: “How is Peripheral Input Processed in the Central Nervous System?” – Anderson Room
Chairred by Dr. T. Finger, Univ. of Colorado
COMPUTATIONAL MAPS IN THE NERVOUS SYSTEM
Dr. Eric Knudsen
Stanford University, USA
FROM RECEPTOR ACTIVITY TO DESCENDING OUTPUT – A SEARCH FOR THE NEURAL CODE UNDERLYING ODOR-GUIDED BEHAVIOUR
Dr. Jürgen Boeckh
University of Regensburg, FRG
Coffee, Tea Break
ORGANIZATION OF Olfactory BULB OUTPUT CELLS AND THEIR LOCAL CURCIT RELATIONSHIPS
Dr. John Scott
Emory University, USA
CORTICAL ORGANIZATION IN GUSTATORY PERCEPTION
Dr. Takashi Yamamoto
Osaka University Dental School, Japan
DISCUSSION
12:00 noon Lunch Break
Box lunches are available to those who have pre-
registered (see Course Application)
BUS TRIP TO MAROON BELLS (see General Information and Course Application)
2:00 p.m. Association for Chemoreception Sciences – General Business Meeting
3:00 p.m. Volunteer Papers, Session IIA – Kearns Room
Volunteer Papers, Session IIB – Anderson Room
Volunteer Papers, Session IIC – Max Park Room, Hotel Wildwood
6:30 p.m. Dinner Break
8:30 p.m. Poster Session II – Haaglund Room
WEDNESDAY
July 23, 1986
7:15 a.m. BREAKFAST WORKSHOPS (Separate registration
INTRODUCTIONS
Dr. Maxwell M. Mozell, Chairman
International Commission on Olfaction and Taste
8:30 p.m. Poster Session III – Hoaglund Room

THURSDAY July 24, 1986
7:15 a.m. BREAKFAST WORKSHOPS (Separate registration is required – see Course Application)
III A: ROUNDTABLE DISCUSSION – Roof Garden
A follow-up on the preceding day’s symposium
*Dr. David Horning, St. Lawrence University
Dr. Steven Price, Medical College of Virginia
Dr. Robert J. O’Connell, Worcester Foundation
Dr. Jan E. R. Frijters, Agricultural University
Dr. David Laing, CSIRO
Dr. Maxwell M. Mozell, Upstate Medical Center

III B: RECENT TRENDS IN CLINICAL MEASUREMENT OF TASTE AND SMELL – Kearns Room
Panelists:
Dr. Janneane F. Gent, University of Connecticut
Dr. Gregg Settle, University of Pennsylvania
Dr. Hiroshi Tomita, Nihon University
A movie by Dr. Hiroshi Tomita on taste abnormalities and their diagnosis will be shown.

III C: SENSORY PROCESSING AND THE CHEMICAL SENSES: COGNITIVE APPROACHES – Plaza
Panelists:
*Dr. Bruce Halpern, Cornell University
Dr. James Kuznicki, The Procter and Gamble Company
Dr. Harry Lawless, S. C. Johnson and Son, Inc.
Dr. Claire Murphy, San Diego State University
*Chairpersons

or
7:30 a.m. Continental Breakfast – Conference Center Lobby

8:30 a.m. SYMPOSIUM “From Reception to Perception: Summary and Synthesis” – Anderson Room
Chaired by Dr. Stephen Roper, Colorado State University
HOW MOTILE BACTERIA SENSE AND RESPOND TO CHEMICALS
Dr. Julius Adler
University of Wisconsin, USA
ORGANIZING PRINCIPLES FOR MOLECULAR INFORMATION PROCESSING IN OLFACTORY SYSTEMS
Dr. Gordon Shepherd
Yale University Medical School, USA
ADAPTATION PROCESSES IN INSECT OLFACTORY RECEPTORS: THEIR RELATION TO TRANSDUCTION AND ORIENTATION
Dr. Karl-Ernst Kaissling
Max-Planck Institut für Verhaltensphysiologie, FRG
Coffee, Tea Break
STANDARDIZED OLFACTOMETER IN JAPAN – A REVIEW OVER TEN YEARS
Dr. Sadayuki F. Takagi
Gunnma University School of Medicine, Japan
VISUAL APPROACH TO FRAGRANCE DESCRIPTION
Dr. Maurice Thibeud
L. Givaudan & Cie SA, Switzerland
12:00 noon Symposium Adjourns.
12:30 p.m. RIVER RAFTING TRIP (See Course Application)

SLIDE PRESENTATIONS
MONDAY, July 21, 1986
BIOCHEMISTRY, TRANSDUCTION, RECEPTOR MODELS
Session IA: Kearns Room
Chaired By: Joseph G. Brand

3:00 - S. 1. KENZO KURIHARA, MAKOTO NAKAMURA and MAKOTO KASHIWAYANAGI. (Faculty of Pharmaceutical Sciences, Hokkaido University, Sapporo, Japan.) Dynamic Conformational Changes of Receptor Domains in Gustatory and Olfactory Cell Membranes.

3:15 - S. 2. HARRY WMS. HARPER. (Eastern Research Center, Stauffer Chemical Co., Dobbs Ferry, NY 10522.) A Diffusion Potential Model of Salt Taste Receptors.

3:30 - S. 3. WILLIAM JAKINOVICH, JR. and VASILIKA VLADOPOLOUS. (Dept. of Biological Sciences, Herbert H. Lehman College, CUNY, Bronx, NY 10468.) Comparison of Efficacy of Stimulators and Inhibitors of the Gerbil’s Sugar Taste Response.

3:45 - S. 4. JOSEPH G. BRAND1, 2, BRUCE P. BRYANT3, ROBERT H. CAGAN4 and D. LYNN KALINOSKI1. (Monell Chemical Senses Center and Veterans Administration Medical Center, University of Pennsylvania, Philadelphia, PA 19104 and Colgate-Palmolive Co., Research and Development, Piscataway, NJ 08854.) Enantiomeric Specificity of Alanine Taste Receptor Sites in Caffeine.

4:00 - S. 5. D. LYNN KALINOSKI1, BRUCE P. BRYANT1, GADI SHAULSKY3, and JOSEPH G. BRAND1, 2. (Monell Chemical Senses Center, and Veterans Administration Medical Center, University of Pennsylvania, Philadelphia, PA 19104.) Specific L-Arginine Taste Receptor Sites: Biochemical and Neurophysiological Studies.


4:30 - Coffee Break
Chaired By: William Jakinovich, Jr.

4:45 - S. 7. STEVEN PRICE and AMY WILLEY. (Dept. of Physiology and Biophysics, Medical College of Virginia, Virginia Commonwealth University, Richmond, VA 23298.) Benzaldehyde Binding Protein from Dog Olfactory Epithelium.

5:00 - S. 8. ROBERT R.H. ANHOLT2, SUZANNE M. MUMBY2, DORIS A. STOFFERS2, PEGGY R. GIRARD2, J.P. KUO2, ALFRED G. GILMAN2 and SOLOMON H. SNYDER1. (The Department
of Neuroscience, The Johns Hopkins University School of Medicine, Baltimore, MD 21205, The Department of Pharmacology, University of Texas Health Science Center at Dallas, Dallas, Texas 75235, and Department of Pharmacology, Emory University School of Medicine, Atlanta, Georgia 30322.) Transduction Proteins of Olfactory Receptor Cells: Identification of Guanylate Nucleotide Binding Proteins and Protein Kinase C.

5:15 - S. 9. PAMELA B. SKLAR, ROBERT R. ANHOLDT and SOLOMON H. SNYDER. (The Department of Neuroscience, The Johns Hopkins University School of Medicine, Baltimore, MD 21205.) The Odorant-Sensitive Adenylate Cyclase of Olfactory Receptor Cells: Differential Stimulation by Distinct Classes of Odorants.

5:30 - S. 10. JONATHAN PEVSNER, PAMELA B. SKLAR and SOLOMON H. SNYDER. (Depts. of Neuroscience, Pharmacology and Experimental Therapeutics, Psychiatry and Behavioral Sciences, Johns Hopkins University School of Medicine, Baltimore, MD 21205.) Localization of Odorant Binding Protein (OBP) to Nasal Glands and Secretions.

5:45 - S. 11. JAMES E. SCHWOB and DAVID L. GOTTLIEB. (Dept. of Anatomy and Neurobiology, Washington University School of Medicine, St. Louis, MO 63110.) MAB RB-8 That Distinguishes Chemically Distinct Zones in Primary Olfactory Projection Recognizes 125 KDA Membrane-Associated Protein.

6:00 - S. 12. THOMAS A. KEIL. (Max-Planck-Institut fur Verhaltensphysiologie, Gruppe Kniesling, D-8131 Seewiesen, West Germany.) Lectin Binding Sites in Olfactory Sensilla of the Silkmoth, Antheraea polyphemus.

OLFACTORY BULB: ANATOMY AND DEVELOPMENT
Session 1B: Anderson Room
Chaired By: Michael Leon

3:00 - S. 13. CELESTE R. WIRSIG and THOMAS V. GETCHELL. (Dept. of Anatomy and Cell Biology, Wayne State University, Detroit, MI 48201.) Identification of the Terminal Nerve in Two Amphibians Shown by the Localization of LHRH-Like Immunoreactive Material and AChE.

3:15 - S. 14. A. I. FARMBAN, J. L. MORGAN and J. L. HEMPSTEAD. (Dept. of Neurobiology and Physiology, Northwestern University, Evanston, IL 60201 and Roche Institute of Molecular Biology, Nutley, NJ 07110.) Immunofluorescent Studies of the Development of Rat Olfactory Epithelium.

3:30 - S. 15. ESMAIL MEISAMI, JANICE LEU, ROBYN HUDSON and HANS DISTEL. (Dept. of Physiology-Anatomy, University of California, Berkeley, CA 94720, and Inst. Med. Psychol., Univ. Munich, D-8000 Munchen 2, FRG.) Marked Postnatal Increase in the Total Number of Olfactory Neurons and Surface Area of the Mucosa in the Rabbit.

3:45 - S. 16. G. D. ADAMEK, W. T. NICKELL and M. T. SHIPLEY. (Dept. of Anatomy and Cell Biology, University of Cincinnati Medical Center, Cincinnati, OH 45267.) Evidence for Diffuse and Focal Projections from the Olfactory Epithelium to the Bulb.

4:00 - S. 17. P. E. PEDERSEN, G. M. SHEPHERD and C. A. GREER. (Sec. Neuropsychiatry and Neurosurgery, Yale University School of Medicine, New Haven, CT 06510.) Cytochrome Oxidase Staining in the Olfactory Epithelium and Bulb of Normal and Odor-Deprived Neonatal Rats.


4:30 - Coffee Break

Chaired By: Celeste R. Wirsig

4:45 - S. 19. GRAHAM A. BELL, DAVID G. LAING and HELMUT PANHUBER. (CSIRO Division of Food Research, North Ryde, Australia 2113.) Early-Stage Processing of Odor Mixtures.

5:00 - S. 20. MICHAEL LEON, ROBERT COOPERSMITH, REGINA SULLIVAN, DONALD WILSON and CYNTHIA WOO. (Dept. of Psychobiology, University of California, Irvine, CA 92717.) Early Olfactory Learning: Characteristics and Mechanisms.


5:30 - S. 22. HARRIET BAKER. (Dept. of Neurology, Cornell University Medical College, New York, NY 10021.) Dopamine and Substance P are Contained in Different Populations of Tufted Cells in the Syrian and Chinese Hamster Main Olfactory Bulb.

5:45 - S. 23. CHARLES A. GREER. (Sections of Neurosurgery and Neuropsychiatry, Yale University School of Medicine, New Haven, CT 06510.) Conjugate Internalization of Apposed Dendritic Membranes During Synaptic Reorganization in the Olfactory Bulbs of Adult PCD Mice.

BEHAVIOR: PHEROMONES, FOOD AND MIXTURES

Session IC: Max Park Room
Chair: By: Jelle Atema

3:00 - S. 25.  R. PREISS and E. KRAMER. (Max-Planck-Institut für Verhaltensphysiologie, D-8131 Seewiesen, West Germany. Mechanism of Pheromone Orientation in Flying Moths.


3:30 - S. 27.  MARION E. FRANK and THOMAS P. HEITTINGER. (Dept. of Oral Biology, University of Connecticut Health Center, Farmington, CT 06032.) Analysis of Taste Mixtures by Hamsters.

3:45 - S. 28.  CARL PFÄFFMANN and M. SCOTT HERNESS. (Laboratory of Neurobiology and Behavior, The Rockefeller University, New York, NY 10021.) Multiple Bitter Receptor Sites in Hamsters.

4:00 - S. 29.  THOMAS HELLMAN MORTON and J. RUSSELL MASON. (*Dept. of Chemistry, University of California, Riverside, CA 92521 and ^Monell Chemical Senses Center, 3500 Market Street, Philadelphia, PA 19104.) Olfactory Detection of Ketones and Aldehydes by Tiger Salamanders.

4:15 - S. 30.  SHEenan HARPZ and JACOB E. STEINER. (*Dept. of Zoology, Life Sciences Institution and ^Dept. of Oral Biology, Hadassah Faculty of Dental Medicine, The Hebrew University of Jerusalem, Israel.) Behavior: Stereotypes of Eating and Those Displayed in Rejection of Aversion-Tasting Food by the Freshwater Prawn: Macrobrachium rosenbergii.

4:30 - Coffee Break
Chair: By: Charles J. Wysocki

4:45 - S. 31.  RICHARD K. ZIMMER-FAUST. (Marine Science Institute, University of California, Santa Barbara, CA 93106.) Are Feeding Responses by Crustaceans Tuned to the Relative Energy and Nutrient Qualities of Odor?

5:00 - S. 32.  KUNIO TORII, KAZUNORI MAWATARI and YASUMI YUGA. (Laboratories, Ajinomoto Co., Inc., 214, Masadacho, Totsuka-ku, Yokohama, Japan 244.) Effect of Dietary Protein on the Taste Preference for Amino Acids and Sodium Chloride in Rats.

5:15 - S. 33.  MARK I. FRIEDMAN and MICHAEL G. TORDOFF. (Monell Chemical Senses Center, 3500 Market Street, Philadelphia, PA 19104.) Role for the Liver in the Formation of Food Flavor Preferences.

5:30 - S. 34.  WILLIAM C. MICHEL. (Dept. of Biology, University of California, Los Angeles, CA 90024.) Contact Chemoreception and Mate Recognition by an Antarctic Crustacean.

5:45 - S. 35.  ROBERT T. MASON, JOHN W. CHINN and DAVID CREWS. (Departments of Zoology and ^Chemistry, University of Texas, Austin, TX 78712.) Seasonal and Sex Differences in Gardner Snake Chemical Cues.

6:00 - S. 36.  JOHN J. LEPRÉ and CHARLES J. WYSOCKI. (Monell Chemical Senses Center, 3500 Market Street, Philadelphia, PA 19104.) Vomeronasal Chemoreception May Activate Reproduction in Reflex-Ovulating Prairie Voles.


POSTER SESSION I

MONDAY, July 21, 1986
Hoaglund Room

MOLECULAR ASPECTS OF CHEMOSENSORY TRANSDUCTION

P. 1.  KAZUMITSU HANAI, MASAHIKO SAKAGUCHI, SACHIKO MATSUHASHI, KATSUJI HORI and HIROMI HIROTA. (Dept. of Biology, Faculty of Science, Kyushu University 33, Fukuoka 812, Japan and *Dept. of Biochemistry, Saga Medical School, Saga 840-01, Japan.) Multiple Receptors Mediating the Feeding Response of Hydra and Monoclonal Antibodies Against One of the Receptors.

P. 2.  STEPHANIE SCHULZ and JUDITH VAN HOUTEN. (Dept. of Zoology, University of Vermont, Burlington, VT 05405.) Progress on the Identification of the Polypeptide Chemoreceptor of Paramaecium.

P. 3.  ICHIRO SHIMADA, YUJI MAKI and HIROSHI SUGIYAMA. (Dept. of Biological Science, Tohoku University, Kawauchi, Sendai 980, ^Dept. of Chemistry, Faculty of Science, Yamagata University, Yamagata 990 and ^Chemical Research Institute of Non-aqueous Solution, Tohoku University, Katahira, Sendai 980.) Stereospecificity of the Alkyl Site for Optical Isomers of Dipeptides in the Labelled Sugar Receptor of the Fleshfly.

P. 4.  MAKOTO KUSHIWAYANAGI, KIMIE SAI and KENZO KURIHARA. (Faculty of Pharmaceut. Science, Hokkaido University, Sapporo 066, Japan.) Changes in Membrane Potential and Membrane Fluidity in Response to Various Odorants in Cell Preparations Isolated from Porcine Olfactory Mucosa.
P. 5. HENRY G. TRAPODO-ROSENTHAL, WILLIAM E. S. CARR, SCOTT M. LAMBERT and MARSHA L. MILSTEAD. (C. V. Whitney Laboratory and Dept. of Zoology, University of Florida.) The Biochemistry of Olfactory Partnering System.

P. 6. RICHARD SEFECKA1 and LINDA M. KENNEDY2. (1IBM Instruments, Inc., Danbury, CT 06810, 2Dept. of Biology, Clark University, Worcester, MA 01610.) Chemical Analyses of Hodulin, the Sweetness-suppressing Principle from Hovenia dulcis Leaves.

PHEROMONES


P. 8. WITHDRAWN


P. 10. M. S. MAYER and R. W. MANKIN. (USDA, ARS; Insect Attractants, Behavior, and Basic Biology Research Laboratory, P.O. Box 14565, Gainesville, FL 32604.) A Linkage Between Coding of Quantity and Quality of Pheromone Gland Components by Receptor Cells of Trichoplusia NI.

P. 11. JEFFREY HALPERN, NANCY SCHULMAN and MIMI HALPERN. (Dept. of Anatomy and Cell Biology, Downstate Medical Center, Brooklyn, NY 11203.) Earthworm Alarm Pheromone is a Garter Snake Chemoeattractant.

P. 12. KUNIO YAMAZAKI1, GARY K. BEAUCHAMP1, OSAMU MATSUZAKI1, DONNA KUPNIEWSKI2, JUDY BARD2, LEWIS THOMAS2 and EDWARD A. BOYSE2. (1Monell Chemical Senses Center, Philadelphia, PA 19104 and 2Memorial Sloan-Kettering Cancer Center, New York, NY 10021.) Influence of a Single Mutation on the Incidence of Pregnancy Block in Mice.


OLFACTORY ELECTROPHYSIOLOGY

P. 14. K. E. KAISLING, C. ZACK-STRAUSFELD and E. RUMBO. (Max-Planck-Institut fur Verhaltensphysiologie, 8131 Seewiesen, FRG. 1CSIRO, P.O. Box 1700, Canberra, Australia. Adaptation Processes in Insect Olfactory Receptors: Their Relation to Transduction and Orientation.

P. 15. CHARLES D. DERBY1 and WILLIAM E. S. CARR2 and BARRY W. ACHÉ2 (1Dept. of Biology, Georgia State University, Atlanta, GA 30303.) (2C. V. Whitney Lab, University of Florida, Ft. 1, Box 121, St. Augustine, FL 32086.) AMP Receptors of the Spiny Lobster: External Receptors on the Olfactory Organs and Internal Receptors in the Brain.

P. 16. BRUCE D. WINEGAR and ROLLIE SCHAFER. (Dept. of Biological Sciences, North Texas State University, Denton, TX 76203-5218.) Evidence for Participation by Calcium and Cyclic AMP in Olfactory Transduction.

P. 17. BRUCE R. JOHNSON, CARL L. MERRILL, ROY C. OGLE and JELLE ATEMA. (Boston University Marine Program, Marine Biological Laboratory, Woods Hole, MA 02545.) Tuning of Olfactory Neurons Sensitive to Hydrox-L-Proline in the American Lobster.

P. 18. T. A. HARRISON and J. W. SCOTT. (Dept. of Anatomy and Cell Biology, Emory University School of Medicine, Atlanta, GA 30322.) Analysis of Olfactory Neuronal Responses by a Method of Spike Train Matching.

P. 19. LLOYD HASTINGS and TRUE-JENN SUN. (Dept. of Environmental Health, University of Cincinnati, College of Medicine, Cincinnati, OH 45267-0056.) Effects of Cadmium on Rat Olfactory System.

P. 20. MARIE C. CLUGNET and J. L. PRICE. (Dept. of Anatomy and Neurobiology, Washington University School of Medicine, St. Louis, MO 63110.) Olfactory Input to Prefrontal Cortex in the Rat.

P. 21. EDMUND A. ARBAS, CAROL J. HUMPHEYS and BARRY W. ACHÉ. (C. V. Whitney Lab., Univ. of Florida, St. Augustine, FL 32086.) Morphological and Physiological Characterization of Interneurons in the Olfactory Midbrain of the Crayfish.

P. 22. MICHAEL MEREDITH. (Dept. of Biological Science, Florida State University, Tallahassee, FL 32306.) Temporal and Spatial Patterns of Response to Odor in the Hamster Olfactory Bulb: Single Unit Recordings and Computer Simulation.


OLFACTION: BEHAVIOR


P. 25. LARRY CLARK1 and J. RUSSELL MASON1, 2. (Monell Chemical Senses Center, 3500 Market Street, Philadelphia, PA 19104, and 2Dept. of Biology, University of Pennsylvania, Philadelphia, PA 19104.) Olfactory Discrimination of Plant Volatiles by the European Starling.

P. 26. KIMBERLY MAY, LAWRENCE MYERS and DONALD BUXTON. (Dept. of Physiology and
P. 27. JACQUELINE FINE and CHARLES D. DERBY. (Dept. of Biology, Georgia State University, Atlanta, GA 30303.) Olfactory Discrimination: Behavioral Abilities of the Spiny Lobster.

P. 28. LEE ANNE MARTINEZ. (Dept. of Entomology, Cornell University, Ithaca, NY 14853.) Morphological and Behavioral Evidence for Chemoreception by Predaceous Stonefly Nymphs and Their Mayfly Prey.

OLFACTION: CENTRAL NERVOUS SYSTEM

P. 29. M. T. SHIPLEY, W. T. NICKEL and J. McLEAN. (Dept. of Anatomy and Cell Biology, Univ. of Cincinnati College of Medicine, Cincinnati, OH 45267.) Organization of Afferents from the Nucleus of the Diagonal Band to the Olfactory Bulb.

P. 30. M. L. GETCHELL, B. ZIELINSKI and T. V. GETCHELL. (Dept. of Anatomy and Cell Biology, Wayne State University School of Medicine, Detroit, MI 48201.) Evidence for Cholinergic Involvement in the Secretory Response of Olfactory Glands of the Salamander to Pyrazine.

P. 31. BERNICE M. WENZEL and ESMAIL MEISAMI. (Dept. Physiology, University of California, Los Angeles, CA 90024 and Dept. Physiology-Anatomy, University of California, Berkeley, CA 94720.) Number, Size and Density of Mitral Cells in the Olfactory Bulbs of the Northern Fulmar and Rock Dove.

P. 32. KAZUYOSHI UENO, YUTAKA HANAMURE, JEUNG GWEON LEE and MASARU OHYAMA. (Dept. of Otolaryngology, Faculty of Medicine, Kagoshima Univ., Kagoshima 890 Japan.) Functional Morphology of the Olfactory Epithelium.

P. 33. SHUN TarO SHIHGHARA, JUNKO YASUKATA, HIROSHI TOMITA and MASAOI OKANO. (Dept. of Otorhinolaryngology, Nihon University, School of Medicine; Dept. of Veterinary Anatomy, College of Agriculture and Veterinary Medicine, Nihon University, Tokyo, Japan.) Effect of Injection of Calcium, EGTA and Cyclic Nucleotides into the Taste Cell of Mouse.

P. 34. JOE E. SPRINGER, SOOKYONG KOH, MARK W. TAYRIEN and REBEKAH LOY. (Dept. of Neurobiology and Anatomy, University of Rochester Medical Center, Rochester, New York 14642.) Immunocytochemical Localization of Nerve Growth Factor (NGF) and NGF Receptor in the Rat Olfactory Bulb.

P. 35. JAY B. LABOV, YAIR KATZ, CHARLES J. WYSOCKI, GARY K. BEAUCHAMP and LINDA M. WYSOCKI. (Monell Chemical Senses Center, Philadelphia, PA 19104, and Dept. of Biology, Colby College, Waterville, ME 04901.) Elevated Levels of Immunoreactive Beta-Endorphin in Rostral and Caudal Sections of Olfactory Bulbs from Male Guinea Pigs Exposed to Odors of Conspecific Females.

P. 36. J. L. PRICE and T. A. FULLER. (Dept. of Anatomy and Neurobiology, Washington University School of Medicine, St. Louis, MO 63110.) Putative Glutamergic and Asparaginyl Cells in the Olfactory Bulb of the Rat.

SLIDE PRESENTATIONS

TUESDAY, July 22, 1986

MEMBRANE CHANNELS AND INTRACELLULAR RECORDING

Session IIA: Kears Room

Chaired By: John H. Teeter

3:00 - S. 38. S. C. KINNAMON and S. D. ROPER. (Rocky Mountain Taste and Smell Center, University of Colorado Health Sciences Center, Denver, CO 80262 and Dept. of Anatomy, Colorado State University, Fort Collins, CO 80523.) Outward Currents in Isolated Taste Receptor Cells of the Mudpuppy.

3:15 - S. 39. JOHN TEETER. (Monell Chemical Senses Center and Dept. of Physiology, University of Pennsylvania School of Medicine, Philadelphia, PA 19104.) Quasi-Regenerative Responses to Chemical Stimuli in vivo Taste Cells of the Mudpuppy.

3:30 - S. 40. THOMAS P. HETFINGER and MARION E. FRANK. (Dept. of Oral Biology, University of Connecticut Health Center, Farmington, CT 06032.) Amiloride Produces Acute Inhibition and Chronic Sensitization of Neural Taste Responses to Sodium Chloride.

3:45 - S. 41. M. SCOTT HERNESS. (Laboratory of Neurobiology and Behavior, The Rockefeller University, New York, NY 10021.) Effect of Amiloride on Iontophoretic and Chemical Stimulation in Hamster and Frog - Neural and Intracellular Evidence.

4:00 - S. 42. KENICHI TONOSAKI and MASAYA FUNAKOSHI. (Dept. of Oral Physiology, School of Dentistry, Asahi University, Gifu 501-02, Japan.) Effect of Injection of Calcium, EGTA and Cyclic Nucleotides into Taste Cell of Mouse.

4:15 - S. 43. THOMAS E. FINGER, HEMA SRIDHAR, MARY WOMBLE, VAR L. ST. JOR and JOHN C. KINNAMON. (Dept. of Anatomy, Univ. of Colorado Medical School, Denver, CO 80262 and Dept. of MCD Biology, University of Colorado, Boulder, CO 80309.) Immunoreactivity to Neuronal Growth-Dependent Membrane Glycoprotein Occurs in a Subset of Taste Receptor Cells in Rat Taste Buds.

4:30 - Coffee Break

Chaired By: Marion E. Frank

4:45 - S. 44. STUART FIRESTONE and FRANK WEIRBLIN, Neurobiology Group, University of California, Berkeley, CA 94720.) The Interaction of...
Generator Current and Voltage Gated Currents in the Olfactory Receptor Response.

5:00 - S. 45. VINCENT E. DIONNE. (Division of Pharmacology, Department of Medicine, University of California, San Diego, CA 92033.) Membrane Conductance Mechanisms in Dissociated Cells from the Necturus Olfactory Epithelium.

5:15 - S. 46. NORIO SUZUKI. (Zoological Institute, Faculty of Science, Hokkaido University, Sapporo 060, Japan.) Voltage-Dependent Ionic Currents in Isolated Olfactory Receptor Cells.

5:30 - S. 47. LEONA MASUKAWA, BRITTA HEDLUND and GORDON SHEPHERD. (Section of Neuroanatomy, Yale University School of Medicine, New Haven, CT 06510.) Changes in Excitable Properties of Olfactory Receptor Neurons Associated with Nerve Regeneration.

5:45 - S. 48. VITALY VODYANOY and IGOR VODYANOY. (Dept. of Physiology & Biophysics, University of California, Irvine, CA 92717.) Cyclic-AMP Modulates the Electrical Properties of Olfactory Receptor Sites Functionally Reconstituted into Bimolecular Liquid Membrane (BLM).

OLFACTORY BULB: PHYSIOLOGY

Session III: Anderson Room
Chaired By: John G. Hildebrand

3:00 - S. 49. THOMAS A. CHRISTENSEN and JOHN G. HILDEBRAND. (Arizona Research Laboratories, Div. of Neurobiology, University of Arizona, Tucson, AZ 85721.) The Coding of Pheromonal Information by “Output” Neurons of the Antennal Lobes of the Sphinx Moth Manduca Sexta.


3:45 - S. 52. TAO JIANG and ANDRE HOLLEY. (Lab. Physiol. Neurosensorielle, Univesite Claude-Bernard, 69622 Villeurbanne cedex, France.) Responses of Olfactory Bulb Neurons to Spatially-Patterned Electrical Stimulation of the Nasal Mucosa.

4:00 - S. 53. W. T. NICKELL and M. T. SHIPLEY. (Dept. of Anatomy and Cell Biology, Univ. of Cincinnati College of Medicine, Cincinnati, OH 45267.) Stimulating the Diagonal Band for 10 Seconds at 10 HZ Causes the Olfactory Bulb to Go Crazy.

4:15 - S. 54. WALTER J. FREEMAN. (Department of Physiology-Anatomy, University of California, Berkeley, CA 94720.) How the Olfactory System Generates Its Intrinsic Background “Spontaneous” EEG and Unit Activity.

4:30 - Coffee Break

Chaired By: Thomas R. Scott

4:45 - S. 55. GARY LICHT and MICHAEL MEREDITH. (Dept. of Biological Sciences, Florida State University, Tallahassee, FL 32306.) Convergence of Olfactory and Vomeronasal Pathways in the PMCN of the Hamster Amygdala.

TASTE: PHYSIOLOGY
(Session III, cont.)

5:00 - S. 56. MARTHA MCPHEETERS and MARION E. FRANK. (Dept. of Oral Biology, University of Connecticut Health Center, Farmington, CT 06032.) Gustatory Stimulus Processing in the Solitary Nucleus of the Hamster.

5:15 - S. 57. THOMAS R. SCOTT and BARBARA K. GIZA. (Dept. of Psychology and Institute of Neuroscience, University of Delaware, Newark, DE 19716.) A Synopsis of the Influence of Satiety Factors on Taste Activity.

5:30 - S. 58. GREGORY P. MARK and THOMAS R. SCOTT. (Dept. of Psychology and Institute of Neuroscience, University of Delaware, Newark, DE 19716.) Gustatory Activity in the NTS of Chronic Decerebrate Rats.

5:45 - S. 59. PATRICIA M. DILORENZO. (Dept. of Psychology, SUNY at Binghamton, Binghamton, NY 13901.) Off Responses to Gustatory Stimuli in the Parabrachial Pons of Decerebrate Rats.

6:00 - S. 60. SUSAN P. TRAVERS and RALPH NORGREN. (Dept. of Behavioral Science, Pennsylvania State University, Hershey, PA 17033.) Responses of Neurons in the Nucleus of the Solitary Tract to Lingular and Palatal Stimulation with Preferred Chemicals.

6:15 - S. 61. THOMAS C. PRITCHARD, ROBERT R. HAMILTON and RALPH NORGREN. (Dept. of Behavioral Science, The Milton S. Hershey Medical Center, Hershey, PA 17033.) Neural Coding of Gustatory Information in the Thalamus of an Awake Primate.

PSYCHOPHYSICS: TIME, SPACE AND MODELS

Session IIC: Max Park Room
Chaired By: Linda Bartoshuk

3:00 - S. 62. TERESE PANTZER1, 2, BRUCE P. HALPERN1, 3 and STEVEN T. KELLING1, 4. (1Dept. of Psychology, 2Dept. of Chemistry, 3Section of Neurobiology and Behavior, 4Field of Physiology, Cornell University, Ithaca, NY 14853.) Taste Intensity and Reaction Time: Cued Versus Uncued Magnitude Estimates.
TUESDAY, July 22, 1986
Hongkong Room

**TRIGEMINAL CHEMORECEPTION**

P. 37. **WAYNE L. SILVER**¹, ADAM H. ARZT², and J. RUSSELL MASON². (¹Dept. of Biology, Wake Forest University, Winston-Salem, NC 27109, ²Monell Center, 3500 Market Street, Philadelphia, PA 19104.) Fuzzy Set Theory Applied to Product Classification by a Sensory Panel.

P. 38. **JEAN-F. BOUVET, JEAN-C. DELAIRE, AND ANDRE HOLLEY.** (Lab. Physiol. Neurosensorielle, Universite Claude-Bernard, 69622 Villeurbanne cedex, France.) Olfactory Receptor Cell Functioning Affected by Trigeminal Nerve Activity and Substance P.


**OTHER CHEMORECEPTORS**

P. 40. **MANFRED SCHMIDT** and WERNER GNATZY. (Gruppe Sinnesphysiologie, Zoolog. Institut., J. W. Goethe-Universitat, Siesmayerstr. 70, 6000 Frankfurt a.M., West Germany.) Contact Chemoreceptors on the Walking Legs of the Shoe Crab, Carcinus Maenas.

P. 41. **JOEL WHITE** and **MICHAEL MEREDITH.** (Dept. of Biological Science, Florida State University, Tallahassee, FL 32306.) The Nervous Terminal of the Shark: Influence on Ganglion Cell Activity.

P. 42. **ELLE COATES, TINA M. CATON, AND GARY O. BALLE.** (Biotechnology Research Division, Lovelace Medical Foundation and Department of Physiology, University of New Mexico, Albuquerque, NM 87108.) Upper Airway (Nasal) Chemoreceptors in a Boid Snake: Ventilatory Response to O2 and CO2.

**VOMERONASAL ORGAN**

P. 43. **NANCY SCHULMAN, EVELYN ERICHSEN** and **MIMI HALPERN.** (Dept. of Anatomy and Cell Biology, Downstate Medical Center, Brooklyn, NY 11203.) Vomeronasal Response to the Chemotactic in
Earthworm Alarm Pheromone is Mediated by the Vomeronasal System.

P. 44. N. JAY BEAN1 and CHARLES J. WYSOCKI2, (1Dept. of Psychology, Vassar College, Poughkeepsie, NY 12601 and Monell Chemical Senses Center, 3500 Market Street, Philadelphia, PA 19104, 2Monell Chemical Senses Center.) Effects of Vomeronasal Organ Removal in Lactating Female Mice: Dissociation of Maternal and Agonistic Behaviors.

CLINICAL

P. 45. JOHN E. AMOORE and ROBERT S. O'NEILL, (Olfacto-Labs, 1414 4th Street, Berkeley, CA 94710.) Clinical Olfactometry: Improved Convenience in Squeeze-bottle Kits; and a Portable Olfactometer.

P. 46. RICHARD M. COSTANZO, PETER G. HEYWOOD, JOHN D. WARD and HAROLD F. YOUNG, (Depts. of Physiology and Biophysics and Division of Neurosurgery, Medical College of Virginia, Richmond, VA 23298.) Neurosurgical Applications of Clinical Olfactory Assessment.

P. 47. H. N. WRIGHT1, R. S. WEINSTOCK2, A. M. SPIEGEL3, M. A. LEVINE4 and A. M. MOSES5, (1Clinical Olfactory Research Center and Dept. of Medicine, SUNY Health Science Center at Syracuse; 2VA Medical Center, Syracuse, NY; 3Molecular Pathophysiology Section NIADDK, NIH, Bethesda, MD; 4Dept. of Medicine, Johns Hopkins Univ. School of Medicine, Baltimore, MD.) Guanine Nucleotide-Binding Stimulatory Protein (G) - A Requisite for Human Odorant Perception.


P. 49. DEBORAH ANNE FROELICH and ROSE MARIE PANGBORN, (Depts. of Nutrition and Food Science, University of California, Davis, CA 95616.) Induction of Human Parotid Salivary Alpha-Amylase Secretion by Oral Stimulation.


P. 51. MELVIN P. ENNS and DAVID E. HORNUNG, (Depts. of Psychology and Biology, St. Lawrence University, Canton, NY 13617.) Contributions of Smell and Taste to the Pleasantness of Flavor.

P. 52. DANIEL M. ENNS1 and KENNETH MULLEN2, (1Philip Morris Research Center, Richmond, VA 23261; 2Department of Mathematics and Statistics, University of Guelph, Guelph, Ontario, Canada N1G 2W1.) A Psychophysical-Decision Model for Sensory Difference Methods.

P. 53. HEATHER J. DUNCAN, AUDREY BUJAUM and MICHAEL G. TORDOFF, (Monell Chemical Senses Center, 3500 Market Street, Philadelphia, PA 19104.) Rats Eating Together Prefer the Taste of Their Food.

P. 54. STEVEN T. KELLING1, EDWARD SCHWARZCHILD1, and BRUCE P. HALPERN2, (1Dept. of Psychology, 2Dept. of Psychology and Section of Neurobiology and Behavior, Cornell University, Ithaca, NY 14853.) Human Gustatory Judgments of Aqueous Square Wave Pulse Trains: Reaction Times and Magnitude Estimations.

P. 55. HELY TUORILA-OLLIKAINEN, (Dept. of Food Chemistry and Technology, University of Helsinki, SF-00710 Helsinki, Finland.) Relationships Between Attitudes and Hedonic Responses to Sweet, Salty and Fatty Stimuli.

P. 56. T. ROBERTS, C. HARD, of STEGERSTAD and G. HELLEKANT, (Depart of Veterinary Science, University of Wisconsin, Madison, WI 53706.) A Fully Automatic Device for Taste Stimulation, Data Acquisition and Data Processing.


P. 58. D. B. KURTZ1, J. C. WALKER1, J. H. REYNOLDS1, D. L. ROBERTS2 and S. YANCELL2, (1BGTC, R. J. Reynolds Tobacco Co., Winston-Salem, NC 27102) and (2University of Pennsylvania, School of Dental Medicine, 4001 Spruce Street, Philadelphia, PA 19104 and Integrated Ionics, Inc., 3325 State Route 130, Dayton, NJ 08810.) Perceptual and Intracutural pH Measurements in Response to Oral Stimulation.


P. 60. * RAINER VOIGT and JELLE ATEMA, (Boston University Marine Program, Marine Biological Laboratory, Woods Hole, MA 02543.) Signal-to-Noise Ratios and a Comparison of Cumulative Self-Adaptation of Taste and Smell Receptor Cells.

P. 61. YASUYUKI KITADA, (Dept. of Physiology Okayama University Dental School, Okayama 700, Japan.) Inhibitory Effects of Ca\(^{2+}\) On The Mg\(^{2+}\) Response of Water Fibers in the Frog Glossopharyngeal Nerve.

P. 62. MOHSEN S. NEJAD and LLOYD M. BEIDLER, (Dept. of Biological Science, Florida State University, Tallahassee, FL 32306.) Taste Responses of the Cross-Regenerated Greater Superficial Petrosal (GSP) and Chorda Tympani (CT) Nerves of the Rat.

P. 63. JAMES L. FRAZIER, (E. I. du Pont, Wilmington, DE 19898.) The Effects of Sesquiterpene Dialdehydes on the Styloconic Taste Cells of the Tobacco Hornworm Larva.
P. 64. INGRID SCHMIEDEL-JAKOB, PETER A. V. ANDERSON, and B. W. ACHE. (C. V. Whitney Laboratory, Univ. Florida, St. Augustine, FL 32086.) Intracellular Recording of Receptor Potential in Primary Chemosensory Neurons.

P. 65. KUNIO YAMAMORI1, MORITAKA NAKAMURA1 and TOSHIKI J. HARA. (Dept. of Fisheries and Oceans, Freshwater Institute, Winnipeg, Canada R3T 2N6; 1Kitasato University School of Fisheries Sciences, Sanriku, Iwate 022-01, Japan.) Gustatory Responses to Tetrodotoxin and Saxitoxin in Rainbow Trout and Arctic Char: A Possible Biological Defense Mechanism.

P. 66. TAKAMITSU HANAMORI, INGLES J. MILLER, JR. and DAVID V. SMITH. (Dept. of Otolaryngology and Maxillofacial Surgery, University of Cincinnati Medical Center, Cincinnati, OH 45267, and Dept. of Anatomy, Bowman Gray School of Medicine, Winston-Salem, NC 27103.) Taste Responsiveness of Hamster Glossopharyngeal Nerve Fibers.

P. 67. SHUITSU HARADA, TAKAYUKI MARUI and YASUO KASAHARA. (Dept. of Oral Physiology, Kagoshima University Dental School, Usuki-Chyo, Kagoshima 890, Japan.) Neural and Behavioral Taste Responses to Amino Acids in Mouse and Rat.

P. 68. HISASHI OGAWA and TOMOKIYO NOMURA. (Dept. of Physiology, Kumamoto University Medical School, Honjo 2-2-1, Kumamoto 860, Japan.) Response Properties of Thalamocortical Relay Neurons Responsive to Natural Stimulation of the Oral Cavity in Rats.

P. 69. NOBUSADA ISHIKO, TAKAMITSU HANAMORI and DAVID V. SMITH. (Dept. of Physiology, Miyazaki Medical College, Miyazaki, 889-16, Japan and Dept. of Otolaryngology and Maxillofacial Surgery, Univ. of Cincinnati Medical Center, Cincinnati, OH 45267.) Gustatory, Thermal and Mechanical Responses of Cells in the Nucleus Tractus Solitarius of the Frog.

P. 70. C. F. LAMB IV and J. CAPRIO. (Dept. of Zoology and Physiology, Louisiana State University, Baton Rouge, LA 70803-1725.) Taste and Tactile Responses in the Superior Secondary Gustatory Nucleus of the Catfish.

P. 71a. ROBERT D. SWEAZEE and ROBERT M. BRADLEY. (Dept. of Oral Biology, School of Dentistry, The University of Michigan, Ann Arbor, MI 48109.) Multimodal Neurons in the Lamb Solitary Nucleus: Responses to Chemical, Tactile and Thermal Stimulation of the Caudal Oral Cavity and Epiglottis.

P. 71b. TAEKO YAMADA, MARI UMEZU and YASUO FUKUSIMA. (Physiological Laboratory, Japan Women's University, Bunkyo-ku, Tokyo, Japan.) Developmental Changes of Chorda Tympani Responses to Four Basic Taste Stimuli in Mice Given Sweet Taste.

TASTE: BEHAVIOR
P. 72. RUSSELL F. REIDINGER1, 2, CHARLES N. STEWART3 and J. RUSSELL MASON4. (1Monell Chemical Senses Center ad Biology Department, University of Pennsylvania, Philadelphia, PA 19104; 2U.S. Fish and Wildlife Service, Federal Center, Lakewood, CO 80225; Psychology Department, Franklin and Marshall College, Lancaster, PA 17604.) Rodenticide Flavor Profiles Identified Through Generalization of Conditioned Flavor Avoidance.

P. 73. ROBIN KRIMM, MOHSEN S. NEJAD, JAMES C. SMITH and LLOYD M. BEIDLER. (Depts. of Psychology and Biological Sciences, The Florida State University, Tallahassee, FL 32306.) The Effects of Bilateral Sectioning of the Chorda Tympani, the Greater Superficial Petrosal Nerve and the Submaxillary Salivary Glands on Daily Eating and Drinking Patterns in Rats.

P. 74. YUZO NINOMIYA, TETSUICHIRO HIGASHI, TSUNEYOSHI MIZUKOSHI and MASAYA FUNAKOSHI. (Depts. of Oral Physiology, Aishi University, School of Dentistry, Gifu 501-02, Japan.) Genetics of the Ability to Perceive Sweetness of D-phenylalanine in Mice.

P. 75. ANN JANE TIERNEY and JELLE ATEMA. (Boston University Marine Program, Marine Biological Laboratory, Woods Hole, MA 02543.) Effects of Short-Term Exposure to Lowered pH on the Behavioral Response of Ctenopharyngodon idella to Chemical Stimuli.

P. 76. E. BOWDAN. (Dept. of Zoology, University of Massachusetts, Amherst, MA 01003.) Tobacco Hornworm Caterpillar Feeding: An Analysis of Biting and Other Activities During Feeding on Tomato Leaf.

P. 77. A BRAUN, J. R. GANCHROW and J. E. STEINER. (The Hebrew University—Hadassah Faculty of Dental Medicine, Dept. of Oral Biology, Jerusalem, Israel.) Behavioral Reactions of Taste Stimuli in Hatching Chicks.

P. 78. GARY. M. BROSVIC1, BURTON M. SLOTNICK and ROBERT I. HENKIN2. (1The American University, Washington, DC and 2George Washington University School of Medicine, Washington, DC 20060.) Taste Detection and Discrimination in Zinc-Deprived Rats.

P. 79. AUDREY B. KAUFF and BURTON M. SLOTNICK. (The American University, Washington, DC 20060.) Gustatory Deficits in Rats with Lesions of the Thalamic Taste Nucleus.

P. 80. LAURA S. WILSON, JAMES C. SMITH, ROSS HENDERSON, JEFFREY SHAUGNESSY, MOHSEN S. NEJAD and LLOYD M. BEIDLER. (Depts. of Psychology and Biological Sciences, The Florida State University, Tallahassee, FL 32306.) An Apparatus for the Detailed Analysis of Short Term Taste Tests in Rats.

P. 81. CHARLES N. STEWART1, JOHANNA IFPT1 and YAIR KATZ2. (1Franklin & Marshall College, Lancaster, PA 17604; 2Monell Chemical Senses Center, Philadelphia, PA 19104.) Taste Preference Changes and Adrenal Response in Pyridoxine-Deficient Rats.

P. 82. BURTON M. SLOTNICK and GARY M. BROSVIC. (The American University, Washington, DC, 20060.)
Failure of Rats to Acquire a Reversal Learning Set When Trained with Taste Cues.

SLIDE PRESENTATIONS

WEDNESDAY, July 23, 1986

RECEPTOR CELL PHYSIOLOGY

Session IIIA: Kearns Room
Chaired By: Barry W. Ache

3:00 - S. 74. WOLF A. KAFKA. (Max-Planck-Institut für Verhaltensphysiologie, D-8313 Seewiesen, FRG.) Olfactory Receptor Cells in Insects: Reaction Spectra and the Concept of Generalists and Specialists in Antherea Polyphemus L.


3:30 - S. 76. JOHN CAPRIO and JOHN DUDEK. (Dept. of Zoology and Physiology, Louisiana State University, Baton Rouge, LA 70803.) Cross Adaptation Experiments Predict Olfactory and Gustatory Responses to Stimulus Mixtures.

3:45 - S. 77. WILLIAM E. S. CARR, RICHARD A. GLEESON, BARRY W. ACHE and MARSHA L. MILSTEAD. (C. V. Whitney Laboratory and Dept. of Zoology, University of Florida.) ATP-Sensitive Olfactory Receptors: Similarities to Pu-Type Purinoceptors.

4:00 - S. 78. MARILYN B. WHITNEY and LINDA M. KENNEDY. (Dept. of Biology, Clark University, Worcester, MA 01610.) Temporal Analyses of the Actions of Normal Alcohols on Taste Receptor Cell Responses to Sucrose.

4:15 - S. 79. RUDOLF ALEXANDER STEINBRECHT. (Max-Planck-Institut für Verhaltensphysiologie, D-8313 Seewiesen, W Germany.) The Electrolyte Distribution in Insect Olfactory Sensilla as Revealed by X-Ray Microanalysis.

4:30 - Coffee Break
Chaired By: John Caprio

4:45 - S. 80. ALAN J. GRANT1, ROBERT J. O'CONNELL1 and ABNER M. HAMMOND, JR.2 ("The Worcester Foundation for Experimental Biology, 222 Maple Avenue, Shrewsbury, MA 01545.") (1Department of Entomology, Louisiana State University, Baton Rouge, LA 70803.) Neurophysiological Responses to Pheromone Blend Components in the Soybean Looper Moth. Pseudoplasia Includens (Walker).

5:00 - S. 81. S. A. SIMON, R. ROBB and J. GARVIN. (Departments of Physiology and Anesthesiology, Duke University Medical Center, Durham, NC 27710.) Epithelial Responses of Rabbit Tongue and Their Involvement in Taste Transduction.

5:15 - S. 82. DAVID L. HILL. (Dept. of Psychiatry, University of Toledo, Toledo, OH 43606.) Development of Amiloride Sensitivity in the Rat Peripheral Gustatory System: A Single Fiber Analysis.

5:30 - S. 83. PETER W. SORENSEN1, TOSHIKAI J. HARA and NORMAN E. STACEY1. (Dept. of Fisheries and Oceans, Freshwater Institute, Winnipeg, Manitoba R3T 2N6 Canada; 1Dept. of Zoology, University of Alberta, Edmonton, Alberta T6G 2E9 Canada.) The Olfactory Sensitivity of Mature Male, Female, Immature and Hypophysectomized Goldfish to L-Amino Acids, Bile Acid, and Steroidal Compounds by Underwater Electro-Olfactogram (EOG).

5:45 - S. 84. G. HELLEKANT, J. N. BROUWER, T. ROBERTS, C. HARD AF SEGERSTAD and H. VAN DER WEL. (Dept. of Veterinary Science, University of Wisconsin, Madison, WI 53701.) Chorda Tympani Nerve Responses to Intralinguai and Surface Taste Stimulation in the Rhesus Monkey and the Rat.

6:00 - S. 85. DALE M. NORRIS. (642 Russell Laboratories, University of Wisconsin, Madison, WI 53706.) Transduction of Repellent Energy State into Cockroach Avoidance Behavior.

6:15 - S. 86. MITSUO TONOIKE. (Osaka Branch, Electrotechnical Laboratory, Amagasaki 661, Japan.) Response Characteristics of Olfactory Evoked Potentials Using Time-Varying Filtering.

TASTE: ANATOMY

Session IIIB: Anderson Room
Chaired By: Bruce Oakley

3:00 - S. 87. FERDINAND A. SIBBING. (Dept. of Exp. Animal Morphology and Cell Biology, Agricultural University, Marjukieweg 40, 6709 PG Wageningen, The Netherlands.) The Role of Taste in the Feeding Mechanism of the Carp (Cyprinidae).

3:15 - S. 88. KLAUS REUTTER. (Anatomical Institute, University of Tuebingen, Oesterbergstrasse 3, 74 Tuebingen, FRG.) Cell Specializations in the Taste Bud of the European Silurid Fish, Sillurus glanis (Teleostei).

3:30 S. 89. BRUCE OAKLEY and MARK A. HOSLEY. (Dept. of Biology, University of Michigan, Ann Arbor, MI 48109.) Development of Rat Foliate Taste Buds.

3:45 - S. 90. DAVID R. RIDDLE and BRUCE OAKLEY. (Dept. of Biology, University of Michigan, Ann Arbor, MI 48109.) Induced Formation of Double Taste Buds in Gerbil Fungiform Papillae.

4:00 - S. 91. C. M. MISTRETTA, T. NAGAI and R. M. BRADLEY. (Dept. of Oral Biology, Dentistry,
and Center for Nursing Research, University of Michigan, Ann Arbor, MI 48109.) Relation of Receptive Field Size and Salt Taste Responses in Chorda Tympani Fibers During Development.

4:15 - S. 92. MARK B. VOGT and CHARLOTTE M. MISTRETTA. (Dept. of Oral Biology, School of Dentistry and Center for Nursing Research, University of Michigan, Ann Arbor, MI 48109.) Receptive Fields of Second Order Taste Neurons in Sheep: Convergence of Afferent Input Increases During Development.

4:30 - Coffee Break

Chaired By: A. I. Farbman

Olfaction: Anatomy (Session IIIb cont.)


5:00 - S. 94. S. GRAHAM, B. M. SLOTNICK, D. G. LAING and G. A. BELL. (The American University, Washington, DC 20016 and CSIRO, Div. Food Res., Australia.) Odor Detection in Rats with Lesions of Olfactory Bulb Areas Identified With 2-DG.

5:15 - S. 95. GARY J. SCHWARTZ and HARVEY J. GRILL. (University of PA, Dept. of Psychology, Philadelphia, PA 19104.) Alterations in Behavioral Responses to Tastes Following Chorda Tympani (CT) and/or Glossopharyngeal (IX) Nerve Section in Rats.

5:30 - S. 96. STEPHEN W. KIEFER, CHRISTINE W. METZLER and NANCY S. MORROW. (Depts. of Psychology, Kansas State University, Manhattan, KS 66506.) The Complex Sweet Taste of Alcohol: Aversion Generalization Data from Normal Rats and Rats Lacking Gustatory Neocortex.

5:45 - S. 97. WESLEY C. LYNCH, CHARLES M. PADEN and SUSAN KRALL. (Depts. of Psychology and Biology, Montana State University, Bozeman, MT 59717.) Decreased Sensitivity to Bitter Solutions Following Chronic Opioid Receptor Blockade.

6:00 - S. 98. RUDY A. BERNARD, TIMOTHY W. FRIEHS and KAREN J. MOONEY. (Dept. of Physiology, Michigan State University, East Lansing, MI 48824.) Myopathic (BIO 14.6) Hamsters Fail to Develop Salt Appetite in Response to DOCA.

6:15 - S. 99. BERT Ph. M. MENCO. (Dept. of Neurobiology and Physiology, O. T. Hogan Bldg., Northwestern University, Evanston, IL 60201.) A Freeze-Fracture Study on the Pre-Natal Development of Ciliated Surfaces of Rat Olfactory Epithelia.

PSYCHOPHYSICS: AGING

Session IIIc: Max Park Room
Chaired by: Gary Beauchamp

3:00 - S. 100. J. CHAUHAN, Z. J. HAWRYSH, C. KO and S. KO. (Dept. Foods and Nutrition, University of Alberta, T6G 2M8.) Taste Perception of Salt in Young, Old and Very Old Adults.

3:15 - S. 101. CLAIRE MURPHY. (Dept. of Psychology, San Diego State University, San Diego, CA 92182-0350.) Effects of Age and Biochemical Status on Preference for Amino Acids.

3:30 - S. 102. WILLIAM S. CAIN and CLAIRE L. MURPHY. (John B. Pierce Foundation, 290 Congress Avenue, New Haven, CT 06519 and Dept. of Psychology, San Diego State University, San Diego, CA 92182.) Influence of Aging on Recognition Memory for Odors and Graphic Stimuli.

3:45 - S. 103. JOSEPH C. STEVENS and WILLIAM S. CAIN. (John B. Pierce Foundation Laboratory, 290 Congress Avenue, New Haven, CT 06519.) Aging Impairs the Ability to Perceive Gas Odor.

PSYCHOPHYSICS: PATHOLOGY

Session IIIc cont.

4:00 - S. 104. JAMES M. WEIFFENBACH, PHILIP C. FOX and BRUCE J. BAUM. (Clinical Investigations Section, National Institute of Dental Research, National Institutes of Health, Bethesda, MD 20892.) Taste and Salivary Gland Dysfunction.

4:15 - S. 105. M. GRUSHKA, B. J. SESSLES and T. P. HOWLEY. (Faculty of Dentistry, University of Toronto, Toronto, Canada M5G 1G6.) Psychophysical Evidence of Taste Dysfunction in Burning Mouth Syndrome (BMS).

4:30 - Coffee Break.

Chaired By: Bruce Jafek

4:45 - S. 106. RICHARD D. MATTHES, CATHY ARNOLD and MARCIA BORAAS. (Monell Chemical Senses Center, Philadelphia, PA 19104 and Fox Chase Cancer Center, Fox Chase, PA 19111.) Blocking Learned Food Aversions in Cancer Patients Receiving Chemotherapy.

5:00 - S. 107. RICHARD L. DOTY, PATRICIO REYES and TOM GREGOR. (Smell and Taste Center, School of Medicine, University of Pennsylvania, Philadelphia, PA 19104 and Department of Neurology, Jefferson Medical College, Philadelphia, PA 19107.) Olfactory Dysfunction in Alzheimer’s Disease.

5:15 - S. 108. EDWARD E. MORRISON, PASQUALE P. C. GRAZIADEI and RICHARD M. COSTANZO. (1Dept. of Physiology and Biophysics, Medical College of Virginia, Richmond, VA 23298 and Dept. of Biological Sciences, Florida State University, Tallahassee, FL 32306.)
POSTER SESSION III

WEDNESDAY, July 23, 1986
Hoaglund Room

MIXTURES

P. 83. DAVID E. HORNUNG and MELVIN P. ENNS. (Dept. of Biology and Psychology, St. Lawrence University, Canton, NY 13617.) Possible Mechanisms for the Processes of Referred Taste and Retronasal Olfaction.

P. 84. BARRY W. ACHE and RICHARD A. GLEESON. (C. V. Whitney Laboratory, Univ. of Florida, St. Augustine, FL 32086.) Heterogeneous Types of Interactions Between Odors at Olfactory Receptor Cells.

P. 85. ROBERT A. FRANK and GARY ARCHAMBO. (Dept. of Psychology, University of Cincinnati, Cincinnati, OH 45221.) Mixture Integration in Sucrose/Sodium Chloride and Sucrose/Citric Acid Solutions: An Assessment of Subadditivity for Total Mixture Intensity.

P. 86. T. J. HERDER, B. W. ACHE, and W. E. S. CARR. (C. V. Whitney Laboratory, Univ. of Florida, St. Augustine, FL 32086.) Concentration-Independence of Mixture Interactions in the Antennular (Olfactory) Pathway of the Spiny Lobster.

P. 87. ROSE MARIE PANGBORN, ANDREA L. KAYE and CAROLINE T. WANG. (Food Science and Technology, University of California, Davis CA 95616.) Sensory Responses to Sucrose and Fat in Milk Drinks.

P. 88. LAWRENCE J. MYERS, RANDY BODDE and KIMBERLY MAY. (Dept. of Physiology and Pharmacology, Auburn University, AL 36849.) Electrophysiological and Innate Behavioral Responses of the Dog to Intravenous Application of Sweet Compounds.

P. 89. DAVID A. STEVENS and HARRY T. LAWLESS. (Dept. of Psychology, Clark University, Worcester, MA 01610 and S. C. Johnson & Son, Inc., Racine, WI 53403.) Sequential Interactions of Oral Chemical Irritants.

P. 90. TERESA ANNE VOLLMECKE. (Dept. of Psychology, University of Pennsylvania, 3815 Walnut Street, Philadelphia, PA 19104.) Long Lasting Effects of Context on Sweetness Evaluation.

P. 91. MICHAEL D. RABIN, AMY L. SCHWARTZ and WILLIAM S. CAIN. (Dept. of Psychology, Yale University and John B. Pierce Foundation Laboratory, New Haven, CT 06519.) Selective Attention for the Components of Odor Mixtures.

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P. 97. ELEANOR E. MIDKIFF and ILENE L. BERNSTEIN. (Dept. of Psychology, Univ. of Washington, Seattle, WA 98195.) Generalization of Conditioned Taste Aversion to NaCl in Fischer-344 and Wistar Rats.

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P. 114. J. R. GANCHROW and D. GANCHROW. (Dept. of Oral Biology, The Hebrew University–Hadassah Faculty of Dental Medicine, Jerusalem, Israel and 2Dept. of Anatomy and Physical Anthropology, Sacker School of Medicine, Tel-Aviv University, Tel-Aviv, Israel.) Embryonic Development of Taste Buds in the Chicken.

P. 115. DAVID V. SMITH and INGLIS J. MILLER, JR. (2Dept. of Otolaryngology and Maxillofacial Surgery, Univ. of Cincinnati Medical Center, Cincinnati, OH 45267 and 2Dept. of Anatomy, Bowman Gray School of Medicine, Wake Forest Univ., Winston-Salem, NC 27103.) Taste Bud Development in Hamster Vullate and Foliate Papillae.

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P. 118. KATE M. GUTHRIE and MICHAEL LEON. (Dept. of Psychobiology, Univ. of California, Irvine, CA 92717.) Developmental Pattern of Ornithine Decarboxylase Activity in the Rat Olfactory Bulb.

P. 119. G. A. MONTI GRAZIADEI, J. A. HECKROTH and P.
P. C. GRAZIADEI. (Dept. of Biological Science, Florida State Univ., Tallahassee, FL 32306.) Transplants of Olfactory Mucosa into the Olfactory Bulb of Rodents.

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GENERAL INFORMATION

CONFERENCE THEME

The IX International Symposium on Olfaction and Taste (ISOT) and the 8th annual meeting of the Association for Chemoreception Sciences (SchemS) presents a conference with the theme, From Receptor to Perception: An International Symposium on Chemical Senses.” An exciting program of formal presentations and informal discussion sessions is planned for this meeting. The venue is a new convention site in Snowmass Village, Colorado, nestled among the largest of the Western United States. The program includes symposia, slide and poster presentations, breakfast workshops, informal reception, barbecue, a banquet, and numerous opportunities for open discussions, such as extended lunch breaks.

Spouses and guests are invited to attend the social events presented by the symposium (including dinners and continental breakfasts) for a reduced fee. Recreational events will be organized (see below). Opportunities for hiking, fishing and other outdoor activities abound. In nearby Aspen, the internationally famous ASPEN MUSIC FESTIVAL, celebrating its 38th season, offers concerts in the beautifully restored Wheeler Opera House and in the grand Music Tent. Detailed programs may be obtained after arriving in Snowmass or by writing the Aspen Music Festival, 200 East Hopkins Street, Aspen Colorado 81611.

Colorado weather features warm days, cool evenings and occasional late afternoon showers. Bring clothing suitable for temperature ranges between 55 and 85 degrees. Casual wear is appropriate and encouraged.

BREAKFAST WORKSHOPS

Breakfast Workshops have been designed to promote open, round-table discussions on specific topics. These workshops will provide an opportunity to meet with other participants in an informal setting and to probe special interests in greater detail than might be possible in symposia and volunteer sessions. These informal gatherings will feature a full breakfast, served buffet-style, and will be held in open patios, weather permitting. The workshops will begin at 7:15 a.m. and conclude at 8:30 a.m., prior to the day’s Symposium. A separate fee will be charged for each breakfast workshop. See course application.

Due to space restrictions, attendance at the breakfast workshops will be strictly limited to a maximum of 25 per workshop. Your early registration will assure your selection and attendance at these round-table discussions. If your first choice is not available, every effort will be made to accommodate your alternate choice(s).

MEALS

The basic registration fee includes continental breakfasts for your convenience at the conference center. Options for box lunches are available (see course application). The fee also includes an outdoor barbecue and a formal banquet. There are no dining facilities in the conference center, but there are several excellent restaurants in Snowmass Village and in nearby Aspen. (Buses run between Aspen and Snowmass Village every hour during the day until 11:00 p.m. — $1.50 one way, 20 minutes.) There are also two grocery stores and a delicatessen in Snowmass Village if you have a condominium and want to cook.

Please contact the Conference Office, Continuing Medical Education, The University of Colorado School of Medicine, 4200 E. 9th Ave., Denver, CO 80262 if you wish vegetarian meals.

TRANSPORTATION

The official host agency for this symposium is Professional Travel Corporation, 77 West 5th Avenue, Denver, Colorado 80204-5102. The group supervisor is Ms. Janet Nelson-Williams. Substantial savings in air and bus fares can be realized by booking your travel through Ms. Nelson-Williams, including travel to Denver’s Stapleton Airport and connections to Snowmass, Colorado. Be sure to identify yourself with the ISOT/SchemS symposium. The toll-free telephone number is 1-800/824-0624. Professional Travel Corporation can also help those of you who wish to rent a car in Aspen/Snowmass. Automobile rentals may be quite limited during the summer season and you are encouraged to reserve well in advance.

A representative from Professional Travel will be at Denver’s Stapleton Airport to assist those who have contacted them in making connections with transportation to Snowmass. The representative will meet you in the baggage claim area at Door #7.

If you wish to travel to Snowmass from Denver via bus and are making your own airline reservations into Denver, make certain that Ms. Nelson-Williams is notified of your arrival time in Denver. A chartered bus will be available at a time which will be adjusted to your flight arrival, but only if Professional Travel has advanced notice. This is particularly important if you have made flight arrangements through your own travel agent.

If you plan to use your own travel agent, please be aware that special fares from Denver to Aspen/Snowmass are available through Aspen Airlines. Identify yourself as a University of Colorado School of Medicine participant traveling to Aspen and refer to fare code KG10.

For participants from Japan, the official host agent is Mr. Midzuwa Mayumi, Vivre International, Inc., Meisei Building, 8-9 Sakuragakicho, Shibuya-ku, Tokyo 150. Telephone: 03-770-3908. Vivre International is handling transportation and hotel bookings for participants traveling from Japan only.

For all other participants, please refer all questions concerning transportation to Ms. Janet Nelson-Williams, Professional Travel Corporation: 1-800/824-0624, or in Colorado: 303/469-5186.

 Lodging

Hotel rooms are reserved for this conference at the Hotel Wildwood, which is next right to the Snowmass Conference Cen-
ter. These rooms have two queen-size beds and a bath. Condominiums are reserved at Woodrun Place, which is only a 5-minute walk to the Conference Center. These condominiums have one, two or three bedrooms and a full kitchen. Please fill out and return the separate lodging form (or a photocopy) which is on this program. If you have not been able to find a roommate on your own, you may contact Ms. Donna Wilsson, 303/394-5676 or Dr. Tom Finger, 303/394-7464. The Department of Anatomy, Campus Box #111, University of Colorado School of Medicine, 4200 East 9th Avenue, Denver, Colorado 80262. Please leave your name and whether you are a smoker or a non-smoker. You will then be matched with an appropriate roommate and notified of your roommate(s). It will then be your responsibility to make these lodging arrangements directly with Woodrun Place or the Hotel Wildwood. To meet the deadlines for the Conference Lodging form (see above), you must contact Ms. Wilsson or Dr. Finger by May 30.

DAILY CARE

The Snowmass Resort Association, through its Guest Services Department, has a Pioneers Program geared for children 6-10. The cost is $32/day, including lunch. The Resort Association also keeps a list of individuals in the Snowmass area who have expressed an interest in being referred for babysitting. The address for both the Pioneers Program and the babysitting is: Snowmass Resort Association, Guest Services Department, P.O. Box 5566, Snowmass Village, Colorado 81618. The phone number is 303/393-2000.

Additionally, Aspen Sprouts, an Aspen-based nursery and toddler school, has a babysitting referral service with insurance coverage on the referred employees that are available after 5:00 p.m. They will sit for children of all ages. The address is 315 Baltic Avenue, Aspen Business Center, Aspen, Colorado 81612; the phone is 303/920-1055.

RECREATION AND ENTERTAINMENT

Four special events have been planned for your enjoyment while in Snowmass.

- On Monday, July 21, a fly-fishing expert from Snowmass Village will give a demonstration and instructions on fly-fishing. There is no cost for this offering. For those of you who wish to do some fishing while in Snowmass, fishing licenses may be obtained in three local sporting goods stores. World-renowned fishing is available on the Roaring Fork River and other local streams.

- On Tuesday, July 22, a bus will pick you up at the Snowmass Conference Center for a 2½-hour trip to Maroon Bells, where you will see some of the most spectacular scenery in the western United States. Boxed lunches will be available for you to buy to eat on the bus, or you may bring your own. The cost

for this offering is $12.00 for the round trip.

- On Wednesday, July 23, a horseback ride is planned for 12:00 p.m. to a lovely meadow outside of Snowmass, where you will have lunch and return at 2:30. No one under six years of age is allowed on a horse, but a horse-drawn wagon is available for youngsters and others who do not wish to ride. There are only 80 horses available, so sign up early! The cost is $25 for adults and $24 for children 10 and under.

- For those of you staying over on Thursday, we have planned a river trip down the Colorado River. A bus will pick you up at the Snowmass Conference Center at 12:00 noon and return you to Snowmass at 5:30 p.m. The cost for this trip is $34.50 for adults and $29.00 for children 15 and under (lunch is included).

See application form to register for these events.

PUBLICATIONS

All abstracts will be published in Chemical Senses unless you expressed otherwise on the abstract form. Revised abstracts will be accepted up until July 24, and can be handed to Dr. Jelle Atena or Dr. John C. Kinnamon at the meeting.

The Symposium will be published in a separate volume, ISOT IX, printed by the New York Academy of Sciences. The editorial committee for ISOT IX will invite a limited number of short papers for inclusion in this volume.

CREDIT

The University of Colorado School of Medicine is accredited by the Accreditation Council for Continuing Medical Education to sponsor continuing medical education for physicians. This offering meets the criteria for 28 credit hours in Category I of the Physician's Recognition Award of the American Medical Association. The credit sheet will be available at the registration desk during the hours the course is in session.

REGISTRATION

The registration fee for this symposium is $115 (U.S. funds only). AChemS members may attend for $100. Guests may attend for $75. After June 20 the registration fee will be $135. AChemS members $115, guests $85. This fee includes continental breakfasts, coffee breaks, a barbecue and formal banquet. Up to ten working days before this course, a 90% refund will be made for cancellations requested by participants. No refunds can be made for cancellations within ten days of this course or for non-attendance.

OTHER INFORMATION

A report prepared by Dr. Jack Pearl, National Institutes of Health, and Dr. Thomas V. Getchell, Wayne State University, that summarizes information concerning support of extramural research and training in the chemical senses will be available at the registration desk. This report gives examples of chemosensory research supported by NIH, titles of NIH chemosensory grants, statistics on growth of support, opportunities for research, and information sources for chemosensory granteees.

The REGISTRATION DESK for the meeting will be open each day during the hours the course is in session. Conference partici-
pants may be reached during these hours by telephoning 303/923-5083.

ASSISTANCE AND/OR ADDITIONAL INFORMATION

Please contact the Office of Continuing Medical Education, University of Colorado School of Medicine, 303/394-5241.

ACKNOWLEDGEMENTS

The IX International Symposium of Olfaction and Taste and the Association for Chemoreception Sciences gratefully acknowledges support for the conference from:

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The Association for Chemoreception Sciences also acknowledges the generous financial support provided by the Corporate Members:

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In addition, the Association for Chemoreception Sciences acknowledges the GIVAUDAN CORPORATION for its support in providing the 8th Annual Givaudan Lecture.

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