# ACHEMS-1990

THE TWELFTH ANNUAL MEETING OF THE ASSOCIATION FOR CHEMORECEPTION SCIENCES

**PROGRAM** 

Hyatt Sarasota Sarasota Florida

April 18 - 22, 1990

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## **AChemS Executive Board 1989-1990**

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### GENERAL INFORMATION

1. Registration:

Wednesday evening: 5:00-7:30 pm (in Sara Desoto South)

Thursday-Saturday morning: 7:30-8:00 am (in Longboat)

Thursday & Friday evenings: 6:00-7:00 pm (in Longboat)

- 2. All slide sessions will be held in the Hernando Desoto Ballroom.
- 3. All poster sessions will be held in the Sara Desoto Ballroom.
- 4. All morning posters should be removed by 3:00 pm.
- 5. All evening posters should be removed by midnight.
- 6. All speakers in slide sessions should meet with the session chairperson and give slides to the projectionist at least 20 minutes prior to start of the session.
- 7. The Friday evening dinner for representatives from industry will be held in the Florida Room. The Saturday luncheon meeting for those interested in clinical issues will also be held in the Florida Room. Tickets should be purchased in advance.
- 8. There will be a van from the hotel to Lido Beach Thursday through Saturday afternoons. The van will leave from the front of the hotel on the hour, beginning at 1 pm. It will leave Lido Beach to return to the hotel on the half hour. The last bus will leave Lido Beach at 4:30 pm.

Selby Library Boulevard of the Arts POSTERS: SARA DESOTO MAIN LOBBY American/Spanish British/French (Upper Level) SLIDES: HERANDO-DESOTO (Upper Levil) Cypress | Sarasota Sara DeSoto North Lower Lobby Buccaneer State Hernando-Florida DeSoto Sara Ballroom DeSoto POOL South Longboat Prefunction Area BOATHOUSE RESTAURANT Prefunction Area PARKING LOT

# ASSOCIATION FOR CHEMORECEPTION SCIENCES TWELFTH ANNUAL MEETING

Wednesday evening, April 18

5:00-7:30 REGISTRATION

Sara Desoto South

6:00-6:30 MEETING FOR GRADUATE STUDENTS RECEIVING TRAVEL/HOUSING AWARDS: MEETING ASSIGNMENTS & INFORMATION

Hernando Desoto Ballroom

6:30 RECEPTION FOR GRADUATE STUDENTS

Hernando Desoto Ballroom

6:30-8:00 OPENING BUFFET

Prefunction Area

8:00-8:30 WELCOME, OPENING REMARKS AND PRESENTATION OF AWARDS

Robert J. O'Connell, President of The Association for Chemoreception Sciences

Hernando Desoto Ballroom

# 8:30-9:30 THE GIVAUDAN LECTURE

Vernon B. Mountcastle, the Johns Hopkins University School of Medicine

Hernando Desoto Ballroom

9:30 SOCIAL RECEPTION & CASH BAR

Prefunction Area

7:30 CONTINENTAL BREAKFAST Prefunction Area

Thursday morning slide session

## HUMAN CHEMOSENSORY PSYCHOPHYSICS

Chairperson: Barry G. Green Monell Chemical Senses Center

8:00 #1 Age-Related Deficits in Odor Recognition Performance as a Function of Retention Interval: Sensory or Cognitive? MAGDALENA M. GILMORE AND TRYGG ENGEN, Brown University.

8:15 #2 The Human Sense of Smell Has a Limited Capacity For Identifying Odors in Mixtures. D.G. LAING AND G.W. FRANCIS, CSIRO Food Research Laboratory, B.A. LIVERMORE, Macquarie University.

8:30 #3 Conditioned "Taste" Aversions in Humans: Are They Olfactory Aversions? LINDA M. BARTOSHUK, Yale University, JEREMY M. WOLFE, Massachusetts Institute of Technology.

8:45 #4 Role of Olfaction in Perception of Nontraditional "Taste" Stimuli. THOMAS P. HETTINGER, WALTER E. MYERS AND MARION E. FRANK, University of Connecticut Health Center.

9:00 #5 Human Obesities and Sensory
Preferences for Sugar/Fat Mixtures: Effects of
Weight Cycling. ADAM DREWNOWSKI,
CANDACE KURTH AND JO RAHAIM, School of Public
Health, University of Michigan.

9:15 #6 Time-quality Tracking: Temporal Patterns of Taste Quality. S.A. ZWILLINGER, S.T. KELLING AND B.P. HALPERN, Cornell University.

9:30 #7 Towards Quantitative Analysis of Gusto- and Nasofacial Reflexes. J. E. STEINER, The Hebrew University 9:45 #8 Preferred Salt Concentration in a Southwestern Sample of 200: Differences among Anglo and Hispanic Preschoolers and Their Parents. CLAIRE MURPHY, KRISTY STRAITS, RANI NIJJAR, JILL SNIFFEN, MAGDALENA M. GILMORE, LISA TSUMURA, SAMUEL JINICH AND MARICELA LEON-FUENTES. San Diego State University AND UCSD

10:00 REFRESHMENT BREAK Prefunction Area

Thursday morning slide session

CENTRAL PATHWAYS: SOLITARY
NUCLEUS

Chairperson: Charlotte M. Mistretta University of Michigan

10:15 #9 GABA-like Immunoreactivity in the Gustatory Zone of the Nucleus of the Solitary Tract in the Hamster: Light and Electron Microscopic Studies. BARRY J. DAVIS, *University of Alabama at Birmingham*.

10:30 #10 Intracellular Recording from Brainstem Taste Neurons. MARTHA MCPHEETERS, THOMAS P. HETTINGER, LAWRENCE D. SAVOY AND MARION E. FRANK, *University of Connecticut Health Center*.

10:45 #11 Separation of Neuron Types in the Gustatory Zone of the Rat Solitary Nucleus Based on Intracellular Electrophysiological Characteristics. ROBERT M. BRADLEY AND ROBERT D. SWEAZEY, School of Dentistry, University of Michigan.

11:00 #12 Taste, Tactile and Gastric Inputs
Converge onto Multimodal Neurons in the
Medulla: Analysis of Single Units from
Multiunit, Extracellular recordings. JAGMEET S.
KANWAL, University of Colorado School of Medicine.

11:15 #13 The Effect of Amiloride on Single Taste Neurons In Rat Nucleus Tractus Solitarius. BARBARA K. GIZA, THOMAS R. SCOTT, ROBERT F. ANTONUCCI AND KATHERINE T. SPENCE, University of Delaware.

## CENTRAL PATHWAYS: FRONTAL CORTEX

Chairperson: Joseph L. Price Washington University School of Medicine

11:30 #14 Olfactory Input to the Orbital Cortex in the Monkey, *Macaca fascicularis*. J.L. PRICE, S.T. CARMICHAEL AND M.C. CLUGNET, *Washington University School of Medicine*.

11:45 #15 Effect of Amygdala and Orbitofrontal Cortex Lesions on Taste Preferences in the Primate. LESLIE L. BAYLIS, U.C. Irvine, DAVID GAFFAN, Oxford University

12:00 #16 Taste-evoked Activity in the Insular-opercular Cortex of the Alert Cynomolgus Monkey. THOMAS R. SCOTT, CARLOS R. PLATA-SALAMAN AND VIRGINIA L. SMITH, University of Delaware.

12:15 #17 The Formation of Bimodal Taste and Visual or Taste and Olfactory Neurons in the Orbitofrontal Cortex of Primates. EDMUND T. ROLLS, SIMON J. THORPE, ROGER MASON, EDWARD A. WAKEMAN AND TERESA L. WHITE, University of Oxford.

# 12:30 EXECUTIVE COMMITTEE MEETING Stateroom

Thursday morning poster session (8:00-12:00)

Chairperson: Gary K. Beauchamp Monell Chemical Senses Center

ANIMAL BEHAVIOR - FEEDING & TASTE AVERSION

P1 #18 Behavioral Responses to Chemical Food Signals by a Salt Marsh Protozoan. M. LEVANDOWSKY. Pace University.

P2 #19 Comparative Plant Recognition Systems of Eastern North American Limenitis (Lepidoptera: Nymphalidae). DAVID FLAIM. University of Maryland.

P3 #20 Endocrine Control of Feeding Behavior in Sand Fiddler Crabs. M. SEARS. Duke University Marine Laboratory.

P4 #21 Chemo-orientation of the Lobster, Homarus americanus, to a Point Source in a Laboratory Flume. NAT SCHOLZ, PAUL A. MOORE, LYNNE LACOMIS, AND JELLE ATEMA. Boston University Marine Program.

P5 #22 High-Speed Electrochemical Recordings With Microvoltammetric Electrodes: A New Tool For High-Resolution Analysis of Aquatic Odor Signals. GREG A. GERHARDT. *University of Colorado*.

P6 #23 Taste-dependent Selection and Rejection by toads. STEVEN T. KELLING, BRUCE P. HALPERN. Cornell University.

P7 #24 Microstructure of Salt Intake During Successive Sodium Depletions. S.P. FRANKMANN, C.J. O'CONNOR, G.P. SMITH. NYU-Cornell Medical Center. J.D. DAVIS. University of Illinois, Chicago.

P8 #25 Changes in Blood Pressure and Urinary Electrolyte Levels With Dietary Obesity and Weight Cycling in Rats. ROBERT J. CONTRERAS, SANDI KING, LAWRENCE RIVES, AMY WILLIAMS AND TIFFANY WATTLETON. University of Alabama.

P9 #26 Preference for Fat-Rich Foods is Related to the Level of Fat in the Rearing Diet. Z.S. WARWICK AND S.S. SCHIFFMAN. Duke University.

P10 #27 The Role of Sucrose-sensitive Neurons in Ingestion of Sweet Stimuli by Hamsters. BRADLEY G. REHNBERG, MARION E. FRANK & THOMAS P. HETTINGER. *University of Connecticut*.

P11 #28 Independent Processing of Ingestive and Aversive Affective Taste Characteristics: A Detailed Analysis of Oral Motor and Somatic Taste Responses. PAUL A.S. BRESLIN, ALAN C. SPECTOR, HARVEY J. GRILL. University of Pennsylvania.

P12 #29 Ibotenic Acid Lesions of the Dorsomedial Hypothalamic Nuclei Induce Enhanced Taste Aversion Learning. SHIGERU FURUTA AND DANIEL A. DEEMS. *University of Pennsylvania*.

### **GENETICS**

P13 #30 RNAs for Proline-Rich Proteins in von Ebner's Gland of Mice and Macaques and for Statherin and Histatins in von Ebner's Gland Containing Tissues of Macaques. E.A. AZEN, L.M. SABATINI, G. HELLEKANT AND T.F. WARNER. University of Wisconsin.

P14 #31 Mouse Taste Genes: Identification, Chromosomal Locations, and Phenotypic Domains. DAVID B. HARDER. Florida State University.

P15 #32 The Sucrose Octaacetate Taste Gene (Soa) is on Distal Mouse Chromosome 6 and is Closely Linked (or Identical) to Salivary Proline Rich Protein Genes (Prp). G. WHITNEY, C.G. CAPELESS, K.S. GANNON, D.B. HARDER. Florida State University. E.A. AZEN. University of Wisconsin. W.G. BEAMER, B.A. TAYLOR. The Jackson Laboratory.

P16 #33 The Sucrose Octaacetate Taste Gene (Soa) Influences Response to Some Other Bitter Tastants. G. WHITNEY, J.C. MAGGIO, D.B. HARDER AND J.D. BOUGHTER, JR. Florida State University.

P17 #34 Pattern Analysis of SOA Drinking for B6.SW-Soa<sup>a</sup>, C57BL/6J and SWR/J Mice. KIMBERLEY S. GANNON, JAMES C. SMITH AND GLAYDE WHITNEY. Florida State University.

P18 #35 Amino Acid Preference/Aversion Among Inbred Mice: Multivariate Implications for Genetic Architecture of Taste. C.G. CAPELESS, G. WHITNEY AND D.B. HARDER. Florida State University.

P19 #36 Interspecific Differences in Bitter Taste Sensitivity Influence whether Mice Eat Monarch Butterflies. JOHN I. GLENDINNING. Florida State University.

P20 #37 MHC-Determined Odors are Present in Germ-Free Mice. KUNIO YAMAZAKI, GARY K. BEAUCHAMP. Monell Chemical Senses Center. LEWIS THOMAS. Cornell University Medical College. JUDITH BARD AND EDWARD A. BOYSE. University of Arizona.

P21 #38 Genetic Control Over Salt Preference in Inbred Strains of Mice. GARY K. BEAUCHAMP. Monell Chemical Senses Center.

# OLFACTORY RECEPTOR CELL AND PERIPHERAL NERVE FUNCTION

P22 #39 Acute Olfactory Sensitivity and Specificity of Mature Male Goldfish to Water-borne Androgenic Steroids: A Class of Inhibitory Pheromones? PETER W. SORENSEN. University of Minnesota. NORMAN E. STACEY. University of Alberta. TOSHIAKI J. HARA. Freshwater Institute.

P23 #40 Efflux and Uptake of Amino Acids by the Olfactory Organ of the Spiny Lobster: Effects on the Background Concentrations of Chemoexcitants in the Receptor Environment. H.G. TRAPIDO-ROSENTHAL, R.A. GLEESON AND W.E.S. CARR. *University of Florida*.

P24 #41 Leakage and Reuptake of Intracellular Amino Acids: Implications for Olfactory Cell Sensitivity. R.A. GLEESON, H.G. TRAPIDO-ROSENTHAL AND W.E.S. CARR. University of Florida.

P25 #42 Response Reliability of Chemoreceptor Cells: of Backgrounds and Mixtures. JENNIFER CASTERLINE, CARL MERRILL, RAINER VOIGT AND JELLE ATEMA. Boston University Marine Program.

P26 #43 Boundary Layers and Microscale Fluid Dynamics around Chemosensory Appendages. PAUL A. MOORE AND JELLE ATEMA. Boston University Marine Program.

P27 #44 Effects of Stimulus and Background Concentration on Cumulative Adaptation in Chemoreceptor Cells. RAINER VOIGT AND JELLE ATEMA. Boston University Marine Program.

P28 #45 Spectral Tuning of Lobster Olfactory Cells and their Response to Defined Mixtures and Natural Food Extracts. ANNA WEINSTEIN, RAINER VOIGT AND JELLE ATEMA. Boston University Marine Program.

P29 #46 Olfactory Receptors in Arctic Char (Salvelinus alpinus) with High Sensitivity and Specificity for Prostaglandin f2a. TORARINN SVEINSSON AND TOSHIAKI J. HARA. University of Manitoba and Freshwater Institute.

Thursday afternoon symposium

INDIVIDUAL DIFFERENCES: WHAT DO THEY MEAN IN THE CHEMICAL SENSES AND HOW SHOULD THEY BE TREATED?

Chairperson: Joseph G. Brand Monell Chemical Senses Center

4:00 Introduction. Joseph G. Brand. Monell Chemical Senses Center.

Thursday evening slide session

OLFACTORY RECEPTOR PROCESSES

Chairperson: Vincent Dionne University of California, San Diego

7:00 #48 Olfactory Receptor Neurons from Developing Male Manduca Sexta Antennae Respond to Species-specific Sex Pheromone in Vitro. M. STENGL, J.G. HILDEBRAND, University of Arizona, F. ZUFALL, H. HATT, Technical University of Munich.

7:15 #49 Odor-activated K+ Conductance Inhibits Lobster Olfactory Receptor Cells. W.C. MICHEL AND B.W. ACHE, Whitney Lab and Depts. of Zoology and Neuroscience, University of Florida.

7:30 #50 Excitatory and Inhibitory Responses Induced by Amino Acids in Isolated Mudpuppy Olfactory Receptor Neurons. VINCENT E. DIONNE, University of California, San Diego.

7:45 #51 The Role of Cyclic AMP as a Second Messenger in Vertebrate Olfactory Transduction. STUART FIRESTEIN AND GORDON M. SHEPHERD, Yale University Medical School.

8:00 #52 Purification and Characterization of Odorant Binding Proteins from Nasal Mucosa of Pig and Rabbit. P. PELOSI AND M. DAL MONTE, Istituto di Industrie Agrarie, University of Pisa.

8:15 #53 Whole Cell Patch Recordings Show Frog and Salamander Olfactory Receptor Neurons are Different. RAYMUND PUN AND ROBERT C. GESTELAND, *University of Cincinnati*.

8:30 #54 Mixture Interactions towards Binary Odorant Mixtures in Spiny Lobster: Electrophysiological Assay using Single Antennular Olfactory Receptor Cells. CHARLES D. DERBY, MARIE-NADIA GIRARDOT AND PETER C. DANIEL, Georgia State University. Thursday evening slide session

# PHYSICAL AND ANATOMICAL FACTORS AFFECTING OLFACTORY FUNCTION

Chairperson: Maxwell M. Mozell SUNY Health Science Center, Syracuse

9:00 #55 The Spatial Distribution of Olfactory Receptor Currents. GRAEME LOWE AND GEOFFREY H. GOLD, Monell Chemical Senses Center.

9:15 #56 Temporal Characteristics in Mucosal Inherent Activity Patterns: Evidence from Voltage-Sensitive Dyes. P.F. KENT, M.M. MOZELL AND S.J. MURPHY, Clinical Olfactory Research Center, SUNY Health Science Center.

9:30 #57 Different Odorants Give Different Flow Rate Effects on The Magnitude of The Olfactory Response. M. M. MOZELL, P.F. KENT AND S.J. MURPHY, Clinical Olfactory Research Center, SUNY Health Science Center.

9:45 #58 Olfactory Cavities of Rodents: Novel Problems Arising from Unique Features. ESSIE MEISAMI, University of Illinois.

Thursday evening poster session (7:00-11:00)

Chairperson: William S. Cain
John B. Pierce Foundation and Yale University

PSYCHOPHYSICS: CLINICAL ISSUES AND BASIC SCIENCE

P1 #59 Taste Loss Due to Herpes Zoster Oticus: An Update after 19 months. CARL PFAFFMANN. Rockefeller University. LINDA M. BARTOSHUK. Yale University.

P2 #60 Olfactory Responses to Enantiomers. B.J. COWART. *Monell Chemical Senses Center*. P3 #61 Qualitative and Quantitative Responses of Osmic and Anosmic Subjects to Threshold Concentrations of Various Odors. DAVID A. STEVENS. Clark University. ROBERT J. O'CONNELL. Worcester Foundation for Experimental Biology

P4 #62 Clinical Diagnosis and Treatment of Olfactory Dysfunction: Sensorineural vs. Conductive Disorders. PETER G. HEYWOOD, ROBERT J. DELORENZO, WILLIAM W. CAMPBELL, ARISTIDES SISMANIS, AND RICHARD M. COSTANZO. Medical College of Virginia.

P5 #63 Bilateral Olfactory Dysfunction in Early Stage Medicated and Unmedicated Parkinson's Disease Patients. CHERYL A. PFEIFFER AND RICHARD L. DOTY. University of Pennsylvania. MATTHEW B. STERN, STEVE M. GOLLOMP AND HOWARD I. HURTIG. Graduate Hospital, Philadelphia.

P6 #64 Human Olfactory Biopsy: Comparison of Light and Electron Microscopic Observations from Autopsy Patients. SEOG I. PAIK, MICHAEL N. LEHMAN, DAVID V. SMITH AND ALLEN M. SEIDEN. University of Cincinnati.

P7 #65 Olfactory Threshold and Otolaryngologic Examination in Alzheimer's Disease. JEFFREY I. FELDMAN, CLAIRE MURPHY, T.M. DAVIDSON, G. GALINDA AND A.A. JALOWAYSKI. UCSD Medical Center and San Diego State University.

P8 #66 Olfaction in Alzheimer's Disease. SAMUEL JINICH, ROBBIE RHODES AND CLAIRE MURPHY. UCSD and San Diego State University.

P9 #67 Missing Ingredients I: Aging and the Discrimination of an Aromatic Flavor. JOSEPH C. STEVENS, WILLIAM S. CAIN AND FELICITA REID. John B. Pierce Foundation Laboratory.

P10 #68 Missing Ingredients II: Aging and the Discrimination of the Taste of Sodium Chloride. AMY M. RUTHRUFF, JOSEPH C. STEVENS, WILLIAM S. CAIN AND ANNICK DEMARQUE. John B. Pierce Foundation Laboratory.

P11 #69 Nutritional Assessment of Elderly Persons Eating Flavor Enhanced Foods. S.S. SCHIFFMAN, A.E. FREY AND Z.S. WARWICK. Duke University.

P12 #70 Adult-like Hedonic Responses to Odors in 9-month-old Infants. HILARY J. SCHMIDT. Monell Chemical Senses Center.

P13 #71 Pica, Chemosensation and Iron Deficiency: A Pilot Study. WAYNE L. KLEIN AND THOMAS B. FAST. University of Florida.

P14 #72 Cephalic Phase Insulin Release in Humans. KAREN TEFF AND RICK MATTES. Monell Chemical Senses Center. KARL ENGELMAN. University of Pennsylvania.

P15 #73 Sweet Taste and Energy Intake in Humans. RICHARD MATTES. Monell Chemical Senses Center.

P16 #74 Individual Differences in Perceptions of Selected Gustatory Stimuli and Their Relationships with Food Acceptance. DEIDRE M. BLANK, RICHARD D. MATTES AND DAVID J. MELA. Monell Chemical Senses Center.

P17 #75 Tracking Foodstuff Location Within the Mouth in Real Time. W.E. LEE III AND M.A. CAMPS. University of South Florida.

P18 #76 Quantum Chemical Study of Sweet and Anti-Sweet Principles: Molecular Similarities and Chemo-Receptive Activity. DENNIS GERSON AND RICHARD SEFECKA. *IBM Corporation*.

P19 #77 An Experimental and Computational Study of the Relationship Between the Volumes and Properties of Sweet Molecules. IVAN BARTOLO, MICHAEL G.B. DREW AND GORDON G. BIRCH. University of Reading.

P20 #78 Solute-Water Interactions as Studied by Nuclear Magnetic Resonance Spectrometry: A Contribution to Taste Investigations. JOHN M. GRIGOR AND GORDON G. BIRCH, *University of Reading*.

P21 #79 Open Label Trial of Phosphatidylcholine for Olfactory and Gustatory Problems. ALAN R. HIRSCH. Smell & Taste Treatment and Research Foundation, Chicago.

P22 #80 Electrophysiological Indicators of Laterality in the Human Olfactory System. JAMES D. PRAH. U.S. Environmental Protection Agency.

P23 #81 Chemosensory Evoked Potentials in Patients with Olfactory Disturbances. T.H. HUMMEL, H. PIETSCH, T.H. MOKRUSCH AND G. KOBAL. University of Erlangen-Numberg.

P24 #82 First Recordings of the Cognitive Component P300 Using Olfactory Stimuli. G. KOBAL AND M. DURAND-LAGARDE. University of Erlangen-Nurnberg.

P25 #83 Odor and Cognitive Modulation of the Contingent Negative Variation. TYLER S. LORIG AND MELISSA ROBERTS. Washington & Lee University.

P26 #84 Human Infant Olfactory Processing - the Brain Electrical Activity Mapping (BEAM) Technique. MARTIN KENDAL-REED AND STEVE VAN TOLLER. *University of Warwick*.

### NIH REPRESENTATIVES

P27 Funding Opportunities at the NIDR. PATRICIA BRYANT, NIH.

P28 Funding Opportunities at the NIH. JACK PEARL, NIH

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Friday morning slide session

# HUMAN PSYCHOPHYSICS: TRIGEMINAL FUNCTION

Joseph C. Stevens John B. Pierce Foundation Laboratory

8:00 #85 Thresholds for Odor and Pungency. J. ENRIQUE COMETTO-MUNIZ AND WILLIAM S. CAIN, John B. Pierce Foundation Laboratory and Yale University.

8:15 #86 Cross-Sensitization and Desensitization Between Capsaicin and Piperine: Evidence of Partial Independence of Sensory Mechanisms. BARRY G. GREEN, Monell Chemical Senses Center.

8:30 #87 Oral Capsaicin Desensitization and its Effects on Taste. TRACY KARRER. Yale University. LINDA BARTOSHUK. Yale School of Medicine.

8:45 #88 The Effects of Ethanol and pH on Sourness, Bitterness and Astringency Intensity and Temporal Perception. U. FISCHER AND A.C. NOBLE, University of California, Davis.

9:00 #89 Qualitative and Quantitative Perceptual Attributes of Astringent Substances. HARRY T. LAWLESS, CHRISTOPHER B. LEE AND RICHARD A. TUCCIARONE, Cornell University.

Friday morning slide session

Chairperson: Inglis J. Miller, Jr. Bowman Gray School of Medicine

TASTE: STRUCTURAL FEATURES

9:15 #90 Taste Bud Quantification in Human Vallate and Foliate Papillae. INGLIS MILLER, JR., RUOYU XIAO AND ROBIN KRIMM, Bowman Gray School of Medicine, Wake Forest University.

9:30 #91 Immuno-Electron Microscopy of Glutamate-Containing Nerve Fibers in the Taste Bud of Mudpuppy (Necturus maculosus).

KUO-SHYAN LU AND STEPHEN D. ROPER, Colorado State University, and the Rocky Mountain Taste and Smell Center.

9:45 #92 Pre- and Postnatal Development of Fungiform Papillae and Their Innervation in Hamster. MARK C. WHITEHEAD AND DIANE L. KACHELE. Ohio State University.

10:00 #93 Posterior Diencephalic Connections of the Gustatory System in the Catfish. C.F. LAMB AND J. CAPRIO, Louisiana State University.

10:15 REFRESHMENT BREAK

## **OLFACTORY EPITHELIUM**

10:45 #94 Differences in Distribution of Sialated Glycoconjugates in Secretory Cells of the Salamander Olfactory Mucosa. JAMES D. FOSTER, MARILYN L. GETCHELL AND THOMAS V. GETCHELL, University of Kentucky College of Medicine.

11:00 #95 Pokeweed Agglutinin Labels a Subpopulation of Olfactory Receptor Neurons in Rainbow Trout. DAVID R. RIDDLE AND BRUCE OAKLEY, University of Michigan.

11:15 #96 Transmembrane Currents in Frog Olfactory Cilia. STEVEN J. KLEENE AND ROBERT C. GESTELAND, *University of Cincinnati*.

11:30 #97 Patch Recording Implications for Olfactory Transduction. ROBERT C. GESTELAND, STEVEN J. KLEENE AND RAYMUND PUN, University of Cincinnati.

12:00 ACHEMS BUSINESS MEETING

Friday morning poster session (8:00-12:00)

Chairperson: James C. Smith Florida State University

# HUMAN CHEMOSENSORY PSYCHOPHYSICS

P1 #98 An Investigation of Taste-Smell Interactions Across Four Tastants and Six Odorants. G. SHAFFER AND R.A. FRANK. University of Cincinnati.

P2 #99 The Enchancement of Sweetness by Strawberry Odor is Instruction-dependent. ROBERT A. FRANK, NANCY WESSEL AND GREGORY SHAFFER. University of Cincinnati.

P3 #100 The Effect of Different Color Intensities on Color-Induced Odor Enhancement. LORI A. WHITTEN AND DEBRA A. ZELLNER. Shippensburg University.

P4 #101 Influence of Acid, Salt, and Fat on the Perception of Saltiness, Sourness, and Selected Texture Parameters of a Cheese Analog. C.R. STAMPANONI, R.M. PANGBORN AND A.C. NOBLE. University of California, Davis.

P5 #102 Making the Taste of Salt More Detectable in Forced Choice Procedures: Implications for Sensory Difference Tests. MICHAEL O'MAHONY. University of California. Davis.

P6 #103 Flavour Enchancing Properties of Talin. A.F. BINGHAM and G.G. BIRCH. Reading University.

P7 #104 The Effect of Caffeine, Ethanol, and Sucrose on Temporal Perception of Menthol. J.M. OPET, R.M. PANGBORN, A.C. NOBLE. University of California, Davis. T.A. PERFETTI. R.J. Reynolds.

P8 #105 Molecular Mixture Models. DANIEL M. ENNIS, Philip Morris Research Center.

P9 #106 The Effect of Ambient Odor on Creativity. SUSAN C. KNASKO. Monell Chemical Senses Center.

P10 #107 Dose-Related Effects of Cigarette Smoking on Olfactory Function. RICHARD E. FRYE, RICHARD L. DOTY AND BRIAN S. SCHWARTZ. University of Pennsylvania.

P11 #108 Analysis of Trial Sequence Position and Diluent Type on the Single Staircase Odor Detection Threshold Value for Phenyl Ethyl Alcohol. JOHN D. PIERCE, JR., UDAYAN AGRAWAL AND RICHARD L. DOTY. University of Pennsylvania.

P12 #109 The Relationship Between Nasal Anatomy and Uninasal Human Olfaction. DAVID HORNUNG. SUNY Health Science Center.

# ANIMAL PSYCHOPHYSICS

P13 #110 The Insect Behavioral Response to Sex Pheromone Is Inflected near Threshold: Evidence of Feature Detection? R.W. MANKIN. U.S.D.A.

P14 #111 Peptide and Amino Acid Mimics of Crab Pumping Pheromones. DAN RITTSCHOF, RICHARD B. FORWARD, JR., CARRIE U. BUSWELL AND D. MATT WACHOWIAK. Duke University.

P15 #112 Effect of Stimulus Intensity on Discrimination of Odorant Mixture Quality by Spiny Lobsters in an Associative Learning Paradigm. J.B. FINE-LEVY AND C.D. DERBY. Georgia State University.

P16 #113 The Effect of Capsaicin Treatment on Tiger Salamander Responses to Chemical Irritation. C.C. KEELEY AND W.L. SILVER. Wake Forest University.

P17 #114 Effects of Deoxycorticosterone Acetate (DOCA) on Salt and Water Intake and Metabolism in Rats. R.A. BERNARD AND K.J. MOONEY. Michigan State University.

P18 #115 A Computerized Method for the Determination of Odor Detection Thresholds in Mice. CHRISTOPHER M. PALATUCCI AND ROBERT J. O'CONNELL. Worcester Foundation for Experimental Biology.

P19 #116 A Detailed Comparison of Sucrose and Saccharin Drinking by the Laboratory Rat. JAMES C. SMITH. Florida State University.

P20 #117 A Moment-by-moment Comparison of Intake of Five Bitter Compounds by Sprague-Dawley Rats. JOHN I. GLENDINNING AND JAMES C. SMITH. Florida State University.

P21 #118 Conditioned Suppression as a Psychophysical Method for Taste Threshold Determination. A. KURT THAW AND JAMES C. SMITH. Florida State University.

P22 #119 Influence of the D-1 Dopamine Receptor Agonist SKF 38393 on the Odor Detection Performance of Male and Female Rats. CHENG LI, CHERYL A. PFEIFFER, JUDITH M. RISSER, AND RICHARD L. DOTY. University of Pennsylvania.

P23 #120 Concanavalin A Selectively Inhibits Odor Detection in the Rat. R. APFELBACH AND A. NAGORNY-DEBUS. *University of Tubingen*. W.F. ASSELBERGS AND E.H. POLAK. *University of Warwick*.

## ANIMAL BEHAVIOR

P24 #121 Domestic Pig: Possible Model for Study of Specific Anosmia to Androstenone. KATHLEEN M. DORRIES, ELIZABETH ADKINS-REGAN, BRUCE P. HALPERN. Cornell University.

P25 #122 Micro-anatomy of the Trunk Tip of Elephas maximus. L. E. L. RASMUSSEN Oregon Graduate Institute AND BRYCE L. MUNGER. Pennsylvania State University

P25 #123 Chemical Profiles of Temporal Gland Secretions from Captive Asian Bull Elephants During Musth and from African Bull Elephants, Living in Wild but Crowded Conditions. L.E.L. RASMUSSEN. Oregon Graduate Institute. D.L. HESS. Oregon Regional Primate Center. A. HALL-MARTIN. Inland Parks, S. Africa.

P27 #124 Molt Control in Sexually Mature Female Lobsters. DIANE F. COWAN. Boston University.

12:00 ACHEMS BUSINESS MEETING

4:00 WORKSHOP ON COMPUTATIONAL MODELING OF CHEMO-RECEPTION AGENTS

Workshop Chairpersons: Dennis Gerson and Richard Sefecka, IBM Corporation

5:30 DINNER FOR INDUSTRY
Florida Room
Carol Christensen, Hostess
The Pillsbury Company

Friday evening slide sessions

6:30 EVOLUTION OF RECEPTOR CELLS, YAKOV A. VINNIKOV, Sechenov Institute of the USSR Academy of Sciences, Leningrad

# CALCIUM ION ACTIVITY IN CHEMOSENSORY TRANSDUCTION

Symposium Chairperson: Joseph G. Brand Monell Chemical Senses Center

7:15 Inositol Polyphosphates and Calcium Signalling. JAMES PUTNEY, NIEHS, Research Triangle Park.

7:45 #125 Characterization of a Paramecium Ca<sup>2+</sup>-ATPase: Putative Transduction Component. V.M. WRIGHT AND J. VAN HOUTEN, University of Vermont.

20

9:45 #132 Contribution of Acidic Compounds to Gender Specific Scent Images in the Tamarin, Saguinus fuscicollis. A.M. BELCHER, G. EPPLE AND AMOS B. SMITH, III, Monell Chemical Senses Center and University of Pennsylvania.

Friday evening poster session (7:00-11:00)

Chairperson: Michael Leon University of California, Irvine

Friday, April 20

TASTE

Oklahoma.

P1 #133 Rat Olfactory Bulb has High Levels of Glycogen as Measured by In Situ Freezing.
ROBERT COOPERSMITH, SUZANNE M. COOPER AND MICHAEL LEON. University of California, Irvine.

P2 #134 Evidence of Functional Topography

Following Complete and Partial Bulbectomy.

KATHLEEN M. GUTHRIE, J.M. HOLMES AND M.

DEVELOPMENT AND PLASTICITY OF CENTRAL PATHWAYS: OLFACTION AND

LEON. University of California, Irvine.

P3 #135 Neurobehavioral Correlates of Olfactory Preference and Aversive Associative Conditioning in Infant Rats. REGINA M. SULLIVAN AND DONALD A. WILSON. University of

P4 #136 Time Course of Olfactory
Deprivation-induced Changes in Olfactory Bulb
Function. DONALD A. WILSON. University of
Oklahoma.

P5 #137 Can Rats Smell If They Have One Olfactory Bulb Removed and the Contralateral Naris Closed? NANCY L. HUNT, ALEJANDRA J. PAZOS AND BURTON M. SLOTNICK. The American University.

P6 #138 Quantification of the Effects of Unilateral Naris Closure on the Olfactory Bulb of Adult Mice. JEFFREY R. HENEGAR AND JOEL A. MARUNIAK. *University of Missouri-Columbia*.

8:00 #126 Distribution of Ca<sup>2</sup> -ATPase Activity in the Olfactory Rosette of Atlantic Salmon: Comparison with NA, K<sup>1</sup>-ATPase and Alanine Receptors. Y.H. LO, T.M. BRADLEY AND D.E. RHOADS, University of Rhode Island.

8:15 #127 Activation of Olfactory Adenylate Cyclase by Calcium via Calmodulin. ROBERT R.H. ANHOLT, ANN M. RIVERS, *Duke University Medical Center.* 

8:30 #128 Inositol-1,4,5-trisphos- phate (IP<sub>3</sub>): An Alternate Second Messenger For Olfactory Transduction? JOHN H. TEETER, TAUFIQUL HUQUE AND DIEGO RESTREPO, Monell Chemical Senses Center.

# ANIMAL BEHAVIOR/CHEMICAL ECOLOGY

Monell Chemical Senses Center

Chairperson: Charles J. Wysocki

9:00 #129 Structural Features of Ventral Chemosensory Organs in Scorpions and Solpugids Suggest Common Evolutionary Origin. PHILIP H. BROWNELL, Oregon State University.

9:15 #130 Bilateral Chorda Tympani Transection Causes Severe Impairments in the Rat's Ability to Discriminate NaCl from KCI. ALAN C. SPECTOR, DAVID DE LANGE, TAKESHI KASAGI, CHRISTINE A. KORNET AND HARVEY J. GRILL, University of Pennsylvania.

9:30 #131 Removal of the Vomeronasal Organ Inhibits Reproductive Physiology and Behavior in Female Prairie Voles. JOHN J. LEPRI, Department of Biology, University of North Carolina, CHARLES J. WYSOCKI, LINDA M. WYSOCKI, Monell Chemical Senses Center, MAGORZATA KRUCZEK, Jagellonian University, Krakow, Poland and Monell Chemical Senses Center.

P7 #139 Deafferented Main Olfactory Bulb Glomeruli Have Elevated Levels of Glial Fibrillary Acidic Protein. MICHAEL POSTON, MOLLY BAILEY, RICHARD AKESON AND MICHAEL SHIPLEY. University of Cincinnati.

P8 #140 Transplant of Fetal Brain Tissue into the Olfactory Bulb of Adult Rats. JOHN H. MCLEAN AND QUOC TRAN. Memorial University of Newfoundland.

P9 #141 Anatomical Evidence For Alterations in Receptive Fields of Rostral NST Neurons During Normal Postnatal Development. PHILLIP S. LASITER. Florida Atlantic University.

P10 #142 Pre- and Postnatal Development of the Rostral Nucleus Tractus Solitarius (NTS) and Geniculate Afference in Hamster. DIANE L. KACHELE, MARK C. WHITEHEAD. Ohio State U. PHILLIP S. LASITER. Flordia Atlantic University.

P11 #143 Restriction of Dietary Sodium During Early Development Alters the Salt Responses of NST Taste Neurons: Reduced Responses in "Deprived" Rats, Hyper-responsivity in "Recovered" Rats. MARK B. VOGT AND DAVID L. HILL. University of Virginia.

P12 #144 Restriction of Dietary Sodium During Early Development Alters the Central Anatomical Organization of the NTS. CAMILLE T. KING AND DAVID L. HILL. University of Virginia.

P13 #145 Neuronal Geometry during Development of a Functionally Defined Region of the Nucleus of the Solitary Tract. CHARLOTTE M. MISTRETTA, MARY WOMBLE AND SUAT GURKAN. *University of Michigan*.

# OLFACTORY RECEPTOR CELL AND PERIPHERAL NERVE FUNCTION

P14 #146 Electrophysiological Studies of the Pectinal Chemosensory System of the Scorpion. D.D. GAFFIN AND P.H. BROWNELL. Oregon State U.

P15 #147 Uptake of Immunoglobulins by Olfactory Receptor Neurons. THOMAS A. BAKER AND JOEL MARUNIAK. *University of Missouri*.

P16 #148 Trace Metal Content of Olfactory Bulbs in Alzheimer's and Parkinson's Disease. J. EVANS, L. HASTINGS, L. OLSON AND B. SHEPPARD. *University of Cincinnati*.

P17 #149 Effects of Unilateral Naris Closure on the Rate of Neurogenesis in the Olfactory Epithelium of Adult Mice. FRANK COROTTO AND JOEL MARUNIAK. *University of Missouri*.

P18 #150 Complete Dependence of Maturation of Olfactory Receptor Neurons in the Postsuckling Rats on Thyroid Hormones. MARK PATER-NOSTRO AND ESSIE MEISAMI. University of Illinois.

P19 #151 Development of the Olfactory
Epithelium: A Combined Histochemical and
2-Deoxyglucose Study in the Mouse. DAVID S.
REASNER AND ROBERT J. O'CONNELL. Worcester

Foundation for Experimental Biology.

P20 #152 Regional Odor Stimulation of Glandular Activity in the Olfactory Epithelium. G.A. BELL. CSIRO, S.E. DYSON. University of Western Australia.

P21 #153 Expression of Carbohydrate Antigens on Rat Olfactory Neurons. G.A. SCHWARTING, M. YAMAMOTO, J.E. CRANDALL. E.K. Shriver Center.

P22 #154 Human Odor Intensity Perception: Correlation with Frog Epithelial Adenylate Cyclase Activity and Transepithelial Voltage Response. DEBORAH S. KREISS, RICHARD L. DOTY, RICHARD E. FRYE. University of Pennsylvania.

P23 #155 Pertussis Toxin Substrates and G-protein-like Immunoreactivity in the Olfactory Organ and CNS of the Spiny Lobster. TIMOTHY S. MCCLINTOCK. Yale University.

SAMUEL C. EDWARDS. *University of South Florida*. BARRY W. ACHE. *The Whitney Laboratory*.

P24 #156 Specificity of Olfactory Receptor Neurons For Pheromones and Host Odors In the Boll Weevil, Anthonomus grandis Boh. (Coleoptera: Curculionidea). JOSEPH C. DICKINS, USDA, ARS, MIssissispi State.

P25 #157 Initial Characterization of Inositol-1,4,5-trisphosphate Binding to Isolated Olfactory Cilia. D. LYNN KALINOSKI, ARDITHANNE G. BOYLE, SCOTT ALDINGER AND DIEGO RESTREPO, Monell Chemical Senses Center.

## P26 Techniques Corner

Saturday, April 21

### 7:30 CONTINENTAL BREAKFAST

Saturday morning slide session

Chairperson: John Kauer New England Medical Center

### **OLFACTORY DEVELOPMENT**

8:00 #158 Development of the Olfactory Epithelium in Normal and Hypothroid Xenopus Larvae. GAIL D. BURD AND LAURIE THOMAS, University of Arizona.

8:15 #159 Development of Calcitonin Gene-Related Peptide in the Mouse Olfactory System. HARRIET BAKER, Cornell University Medical College.

8:30 #160 Olfactory Neurogenesis: Genetic or Environmental Controls? ALBERT I. FARBMAN AND VIRGINIA M. McCARR, Northwestern University.

8:45 #161 Incorporation of <sup>3</sup>H-thymidine in the Embryonic Vomeronasal and Olfactory Epithelia of Garter Snakes. DAVID HOLTZMAN AND MIMI HALPERN, State University of New York.

9:00 #162 Neonatal Learning Increases a Focal Olfactory Bulb Neuronal Population. CYNTHIA C. WOO AND MICHAEL LEON, *University of California, Irvine.* 

Saturday morning oral presentation

9:15 UPDATE FROM THE NIH
James Snow, NIH
Patricia Bryant, NIH
Jack Pearl, NIH

### 9:45 REFRESHMENT BREAK

Saturday morning symposium

## ADVANCES IN DIAGNOSIS AND TREAT-MENT OF TASTE AND SMELL DISORDERS

Chairperson: Claire Murphy San Diego State University and UCSD Medical Center

10:00 Robert I. Henkin, Georgetown University

10:15 Terence M. Davidson, Nasal Dysfunction Clinic, UCSD Medical Center

10:30 April E. Scott, Connecticut Chemosensory Clinical Research Center

10:45 Richard Doty, University of Pennsylvania Taste and Smell Center

11:00 Beverly Cowart, Monell Chemosensory Clinical Research Center

11:15 Allen Seiden, University of Cincinnati College of Medicine

11:30 Donald Leopold, Clinical Olfactory Research Center, SUNY Health Science Center

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12:00 William S. Cain, Discussant, Pierce Foundation, Yale University and Connecticut Chemosensory Clinical Research Center

# 12:30 CLINICAL LUNCHEON MEETING Florida Room

William S. Cain, Host, Pierce Foundation, Yale University and Connecticut Chemosensory Clinical Research Center

1:30 Case Presentations

2:00 Differences Between Single Center and Multi-Center Studies. #163 Mary Folkes, NIH

2:15 A Multi-center Clinical Trial. Jack Pearl, NIH

2:25 Discussion of Clinical Issues and
Multi-center Clinical Trial. Donald Leopold,
Moderator, Clinical Olfactory Research Center, SUNY

Saturday morning poster session (8:00-12:00)

# TASTE: PERIPHERAL AND CENTRAL PATHWAYS

P1 Techniques Corner

P2 #164 Functional Recovery of Sodium Responses in Sodium Deprived Rats: Induction by Anesthetics. ROBERT E. STEWART AND DAVID L. HILL. *University of Virginia*.

P3 #165 Sensory Coding of Deterrent Phytochemicals by Gustatory Organs of the Tobacco Hornworm. FRANK HANSON AND STEPHEN PETERSON. University of Maryland Baltimore County.

P4 #166 Bilateral Lesions of the Chorda Tympani or Glossopharyngeal Nerve Do Not Alter NaCl Preferences in the WKY and SHR. BRADLEY K. FORMAKER AND DAVID L. HILL. University of Virginia. P5 #167 Quantitative Development of Taste Buds in the Human Fetus. RUOYU XIAO AND INGLIS MILLER, JR. Wake Forest University.

Saturday, April 21

P6 #168 Distribution of Substance P-Immunoreactive Nerve Terminals in Gustatory Regions of the Hamster Solitary Nucleus. HEATHER J. DUNCAN, SHERYL K. BRINING AND DAVID V. SMITH. *University of Cincinnati*.

P7 #169 An Examination of the Projection from the Gustatory Cortex to the NTS in the Hamster. J.A. LONDON, C.B. HALSELL, M.B. BARRY, T.S. DONTA. *University of Connecticut.* 

P8 #170 Specificity of Visceral and Pharyngeal Taste Reflex Systems in the Goldfish, Carassius auratus. L.E. GOEHLER AND T.E. FINGER. University of Colorado.

P9 #171 In Vitro Electrophysiology from a Primary Gustatory Nucleus; The Vagal Lobe of Goldfish. T.E. FINGER AND T.V. DUNWIDDIE. University of Colorado.

P10 #172 Behavioral Effects of Descending Input from the Gustatory Neocortex to the Parabrachial Pons in the Rat. S. MONROE AND P.M. DI LORENZO. SUNY at Binghamton.

P11 #173 Lesions of the Thalamic Gustatory Nucleus Produce Deficits in Taste Sensitivity and in Cue Salience. H.K. RENTMEISTER, S. SHEELAR, K. MARTIN and B.M. SLOTNIK. American University.

P12 #174 Intensity Coding in the Gustatory Cortex of the Alert Cynomolgus Monkey. CARLOS R. PLATA-SALAMAN, VIRGINIA L. SMITH AND THOMAS R. SCOTT. *University of Delaware*.

P13 #175 Quality Coding in the Gustatory Cortex of the Alert Cynomolgus Monkey. VIRGINIA L. SMITH, THOMAS R. SCOTT AND CARLOS R. PLATA-SALAMAN. University of Delaware. P14 #176 Coding of Sweet Stimuli in the Gustatory Cortex of the Alert Cynomolgus Monkey. THOMAS R. SCOTT, CARLOS R. PLATA-SALAMAN AND VIRGINIA L. SMITH. University of Delaware.

P15 #177 Coding of Sodium and Lithium Salts in the Gustatory Cortex of the Alert Cynomolgus Monkey. CARLOS R. PLATA-SALAMAN, VIRGINIA L. SMITH AND THOMAS R. SCOTT. *University of Delaware*.

P16 #178 Coding of Acids in the Gustatory Cortex of the Alert Cynomolgus Monkey. VIRGINIA L. SMITH, THOMAS R. SCOTT, AND CARLOS R. PLATA-SALAMAN. University of Delaware.

P17 #179 Coding of Amino Acids in the Gustatory Cortex of the Alert Cynomolgus Monkey. THOMAS R. SCOTT, VIRGINIA L. SMITH AND CARLOS R. PLATA-SALAMAN. *University of Delaware.* 

P18 #180 Coding of Taste Mixtures in the Gustatory Cortex of the Alert Cynomolgus Monkey. CARLOS R. PLATA-SALAMAN, VIRGINIA L. SMITH AND THOMAS R. SCOTT. *University of Delaware*.

P19 #181 Glucagon Administration Affects Taste Responsiveness in Rat Nucleus Tractus Solitarius. BARBARA K. GIZA AND THOMAS R. SCOTT. University of Delaware. RHONDA O. DEEMS. Sandoz Pharmacy. DENNIS A. VANDERWEELE. Occidental College.

Saturday evening slide session

Chairperson: David V. Smith University of Cincinnati

HUMAN OLFACTORY ANATOMY AND PHYSIOLOGY

7:00 #182 Immunohistochemical Localization of Tyrosine Hydroxylase and Olfactory Marker Protein to the Glomerular Layer of the Human Olfactory Bulb. CHARLES A. GREER, ROBIN L. SMITH AND DENNIS D. SPENCER, Yale University School of Medicine, HARRIET BAKER, Cornell University Medical College.

7:15 #183 Staining For Olfactory Marker Protein in Human Olfactory Epithelium Obtained From In Vivo Biopsies And Cadaver Specimens. E.W. JOHNSON, R.C. STRAHAN, P.M. ELLER, B.W. JAFEK AND D.T. MORAN, Rocky Mountain Taste and Smell Center.

7:30 #184 Morphological Observations and Distribution of the Human Olfactory Neuroepithelium. EDWARD E. MORRISON AND RICHARD M. COSTANZO, Medical College of Virginia.

7:45 #185 Successful Treatment of Phantosmia with Preservation Of Olfaction: A Case Report. D.A. LEOPOLD, S.L. YOUNGENTOB, J.E. SCHWOB, D.E. HORNUNG, M.M. MOZELL AND H.N. WRIGHT, Clinical Olfactory Research Center, SUNY Health Sciences Center

### NASAL AIRFLOW

8:00 #186 Rhinomanometric Evaluation of Patients with Anosmia. ALFREDO A.
JALOWAYSKI AND TERENCE M. DAVIDSON, UCSD Medical Center, CLAIRE MURPHY, San Diego State University and UCSD Medical Center.

8:15 #187 Rhythmicity of Nasal Airflow in Children and Adolescents. JULIE A. MENNELLA AND GARY K. BEAUCHAMP, Monell Chemical Senses Center.

8:30 #188 Effects of Odorants on Respiratory Behavior and Nasal Patency. DONALD W. WARREN, *University of North Carolina at Chapel Hill*, JAMES C. WALKER, *R.J. Reynolds Tobacco Co.*  30

#### CLINICAL ISSUES

Chairperson: April E. Scott

University of Connecticut Health Sciences Center

9:00 #189 Chemosensory Function and Appetite in Liver Disease: An Evaluation of 111 Patients. MARK I. FRIEDMAN, RHONDA O. DEEMS, LAWRENCE S. FRIEDMAN, SANTIAGO J. MUNOZ AND WILLIS C. MADDREY, Monell Chemical Senses Center and Jefferson Medical College.

9:15 #190 Chemosensory Dysfunction, Burning Mouth Syndrome (BMS) and Sjogren's Syndrome (SS). APRIL E. SCOTT AND LESLIE BOUVIER, University of Connecticut.

9:30 #191 Taste Performance of Sjogren's Syndrome Patients. J.M. WEIFFENBACH AND P.C. FOX, NIH.

9:45 #192 Drug-related MPTP-Induced Parkinsonism: No Evidence of an Olfactory Deficit. RICHARD L. DOTY, Smell and Taste Center, University of Pennsylvania, ANU SINGH, JAMES TETRUD AND J. WILLIAM LANGSTON, California Parkinson's Foundation.

10:00 #193 Olfactory System Involvement in the Amyotrophic Lateral Sclerosis/Parkinsonism -Dementia Complex of Guam. DANIEL PERL, Mount Sinai Medical Center, RICHARD L. DOTY AND JOHN D. PIERCE, JR., University of Pennsylvania, DANIEL LEVY, Mount Sinai Medical Center, JOHN C. STEELE AND KWANG MING CHEN, Guam Memorial Hospital, LEONARD T. KURLAND, Department of Health Sciences Research, Mayo Clinic.

Saturday evening poster session (7:00-11:00)

Chairperson: Barry W. Ache University of Florida

TASTE RECEPTOR ANATOMY AND IMMUNOHISTO-CHEMISTRY

P1 #194 Expression of Cell Surface Molecules in Rat Taste Cells Depends Upon Their Innervation. DAVID V. SMITH, MICHAEL T. SHIPLEY. University of Cincinnati. RICHARD A. AKESON. Cincinnati Children's Hospital.

P2 #195 Localization of Synaptophysin Immunoreactivity in Rat Lingual Tissue. GINA M. NELSON AND THOMAS E. FINGER. *University of Colorado.* 

P3 #196 Keratin 19-like Immunoreactivity is Specific to Fusiform Cells of Taste Buds. BRUCE OAKLEY, ANNE LAWTON, University of Michigan, YOSHIKI SHIBA, Hiroshima University Dental School, AND LIANNA WONG, University of Michigan.

P4 #197 Transneuronal Labeling of Taste Receptor Cells by Carbocyanine Dye Applied to Peripheral Gustatory Nerves. B. BOTTGER AND T.E. FINGER. *University of Colorado*.

P5 #198 Elevated Calcium Dependent ATPase Activity of Plasma Membranes of Normal and Denervated Fungiform Taste Bud Cells. M.A. BARRY, L.D. SAVOY. *University of Connecticut.* 

P6 #199 Quantitative Analysis of Mitoses Inside Taste Buds. E.M. GRANGER AND L.M. BEIDLER. Florida State University.

P7 #200 Observations of Taste Pore Degeneration in Living Rabbits. ROBIN F. KRIMM AND INGLIS J. MILLER, JR. Wake Forest University.

P8 #201 Ultrastructure of Rabbit Fungiform Taste Buds. ANDREW J. BARBER, SUZANNE M. ROYER AND JOHN C. KINNAMON. *University of Colorado*.

P9 #202 Ultrastructure of Rabbit Circumvallate Taste Buds. JOHN C. GILL, SUZANNE M. ROYER AND JOHN C. KINNAMON. *University of Colorado.* 

### TASTE TRANSDUCTION

P10 #203 Characteristics of the Amiloride-sensitive Na<sup>+</sup> Channel in Taste Cells: Results from Computer Simulation. SHEELLA MIERSON. Virginia Commonwealth University.

P11 #204 Protein Composition of the Von Ebner Gland Secretions. JOHN L. BEIDLER. Florida State University.

P12 #205 Evidence for Ins(1,4,5)P<sup>3</sup> as a Second Messenger in Rat Taste Receptor Cell Signal Transduction. P.M. HWANG, A. VERMA, D.S. BREDT, C. ROSS AND S.H. SNYDER, Johns Hopkins University School of Medicine.

P13 #206 Structure/Activity Studies of Alanine and Arginine Taste Receptors in Channel Catfish. KATERINA LEFTHERIS, BRUCE P. BRYANT, JOSEPH G. BRAND. Monell Chemical Senses Center.

P14 #207 Molecular Recognition: A Quantum Mechanical Study of Amiloride Analogs. C.A. VENANZI, C. PLANT. New Jersey Institute of Technology. T.J. VENANZI. College of New Rochelle.

P15 #208 Inhibition of Taste Responses to Na<sup>+</sup> Salts by Epithelial Na<sup>+</sup> Channel Blockers in Gerbil. S.S. SCHIFFMAN, M.S. SUGGS, E.J. CRAGOE, JR. AND R.P. ERICKSON. *Duke University*.

P16 #209 The Effect of Amiloride Analogs on Taste Responses in Gerbil. S.S. SCHIFFMAN, A.E. FREY, M.S. SUGGS, E.J. CRAGOE, JR. AND R.P. ERICKSON. *Duke University.* 

P17 #210 L-Proline Activates Cation Channels Different from Those Activated by L-Arginine in Reconstituted Taste Epithelial Membranes from Channel Catfish. TAKASHI KUMAZAWA, JOHN H. TEETER AND JOSEPH G. BRAND. Monell Chemical Senses Center.

P18 #211 Two Types of Arginine-Best Taste Units in the Channel Catfish. J. KOHBARA, S. WEGERT AND J. CAPRIO. Louisiana State University.

## CHEMORECEPTION: ALTERNATIVES

P19 #212 Garter Snake Accessory Olfactory Bulb Neurons Respond to a Chemoattractive Protein Purified from Earthworm Secretions. JUN INOUCHI, XIAN-CHENG JIANG, DALTON WANG, JOHN KUBIE AND MIMI HALPERN. SUNY

P20 #213 Immunological Analysis of Chemoattractants From Earthworm To Garter Snakes. DALTON WANG, PING CHEN AND MIMI HALPERN. SUNY

P21 #214 Projections of the Terminal Nerve to the Perygopalatine Ganglion in Voles, *Microtus ochrogaster*. CELESTE R. WIRSIG-WIECHMANN. Wake Forest University. JOHN J. LEPRI. University of North Carolina at Greensboro.

P22 #215 ACh and NE Effects on Elasmobranch Nervus Terminalis Ganglion Cells: Spectral Analysis and Computer Modelling. JOEL WHITE. Tufts-New England Medical Center. MICHAEL MEREDITH. Florida State University.

P23 #216 Vomeronasal Systems in Salamanders: Comparison across Larval and Adult Phases of Species with Differing Life-history Strategies. HEATHER L. EISTHEN, DALE R. SENGELAUB AND JEFFREY R. ALBERTS. *Indiana University*.

P24 #217 LHRH Injected Intracerebrally, Relieves Some Behavioral Deficits of Male Hamsters after Vomeronasal Organ Lesions. MICHAEL MEREDITH, GAY HOWARD AND MARY WISGIRDA. Florida State University.

P25 #218 Nuzzling In The Grey Short-Tailed Oppossum Delivers Odorants To The Vomeronasal Organ. NAOMIE S. PORAN, ALEXANDRA VANDOROS AND MIMI HALPERN. State University of New York.

Trigeminal Nerve Responses to a Variety of Chemical Stimuli. L.G. FARLEY, W.L. SILVER. Wake Forest University.

P27 #220 The System of Solitary Epidermal Chemoreceptor Cells: A Novel Vertebrate Chemosense. KURT KOTRSCHAL. University of Colorado. ROB PETERS. University of Utrecht.

P28 #221 Glutathione Chemoreceptor of Hydra. W. GROSVENOR, S. BELLIS, G. KASS-SIMON AND D.E. RHOADS. University of Rhode Island.

P29 #222 Chemoreception in Fossilized Trilobites: Behavioral, Physiological and Structural Analyses. NEE ANN DERTHAL, MIKE FOOT, TOM TOE, SUE KUMIN, WAYNE PLATINUM-IRIDIUM, TOM GOINGS AND JOHN C. KUMIN. Morrison Formation Geological Laboratory.

Sunday , April 22

7:30 CONTINENTAL BREAKFAST

Sunday morning slide session

Chairperson: Thomas R. Scott University of Delaware

# TASTE CODING

8:00 #223 Voltage-dependent Whole-cell Currents in Isolated Fungiform Taste Buds of the Hamster. THOMAS A. CUMMINGS AND SUE C. KINNAMON, Colorado State University and Rocky Mountain Taste and Smell Center.

8:15 #224 Identification of Potassium Currents in Rat Taste Cells and Their Modulation by Tastants: Whole Cell Patch Clamp Analysis. M. SCOTT HERNESS, *The Rockefeller University*.

8:30 #225 The Anion in Mammalian Salt Taste - a Paracellular Hypothesis. ELLEN J. ELLIOTT AND SIDNEY A. SIMON, Duke University.

8: 45 #226 The Pattern of Kinetics for Hodulcin Suppression of Fly Receptor Cell Responses to Sucrose is Characteristic of an Effect on Breakdown of a Stimulus-receptor Complex. DOUGLAS E. KOLODNY AND LINDA M. KENNEDY, Clark University.

9:00 #227 The Pattern of Kinetics for Gymnemic Acids Suppression of Human Sweetness Perception is Characteristic of an Effect on Breakdown of a Stimulus-receptor Complex. HANNA C. DE LOS SANTOS, SHARON GREEN AND LINDA M. KENNEDY, Clark University.

9:15 #228 Salt Responses of Lingual Branch of Trigeminal Nerve are Inhibited by Lanthanum.
A.L. SOSTMAN AND S.A. SIMON, Duke University.
9:30 #229 A New Method for Recording from the Gerbil's Single Chorda Tympani Neurons.
LATCHMAN SOMENARAIN AND WILLIAM
JAKINOVICH, JR., City University of New York.

9:45 REFRESHMENT BREAK

Sunday, April 22

Sunday morning slide session

Chairperson: Marion Frank
University of Connecticut Health Center

# TASTE NEUROPHYSIOLOGY

10:15 #230 Acid-salt, Sucrose and Quinine Sensitive Fibers in the Glossopharyngeal Nerve of the Rat. MARION E. FRANK, *University of* Connecticut Health Center.

10:30 #231 Depolarizing Responses of Taste Cells to Chemical and Electrical Stimuli at the Apical Pore in Slices of Necturus Lingual Epithelium. DOUGLAS A. EWALD AND STEPHEN D. ROPER, Colorado State University and Rocky Mountain Taste and Smell Center.

10:45 #232 Amliloride-Sensitivity of the Chorda Tympani Response to NaCl in Fischer-344 and Wistar Rats. ILENE L. BERNSTEIN AND ALISON LONGLEY, University of Washington.

# ANIMAL BEHAVIOR/CHEMICAL ECOLOGY: AQUATIC SPECIES

11:00 #233 Mixture Suppression Toward Binary Odorant Mixtures in Spiny Lobsters: Behavioral Assay using the Antennular Flick Response. PETER C. DANIEL AND CHARLES D. DERBY, Georgia State University.

11:15 #234 Fine Structure of Aquatic Odor Plumes in Laboratory and Deep Sea Conditions. JELLE ATEMA, PAUL A. MOORE, Boston University Marine Program, LAWRENCE MADIN, Woods Hole Oceanographic Institute, AND GREG A. GERHARDT, Department of Psychiatry and Pharmacology, University of Colorado.

11:30 #235 Odor Perception in a Marine Predator. RICHARD K. ZIMMER-FAUST, Marine Environmental Sciences Consortium and University of Alabama.

11:45 #236 Chemosensory Similarity of Amino Acids and Other Low Molecular Compounds by Catfish. T. VALENTINCIC, D. OTA, A. BLEJEC AND J. METELKO, *University of Ljubljana, Yugoslavia.* 

Sunday morning poster session

Chairperson: Michael Meredith Florida State University

### **OLFACTORY EPITHELIUM**

P1 #237 Carnosine Synthetase Immunoreactivity in the Olfactory Epithelia of Amphibia. MARIA J. CROWE AND SARAH K. PIXLEY. *University of Cincinnati.* 

P2 #238 Transplantation of Embryonic Cat Nasal Tissue into Adult Cat Spinal Cord. S.K. PIXLEY. University of Cincinnati. D. ANDERSON. Veteran's Administration. P. REIER. University of Florida.

P3 #239 Survival of Olfactory Receptor Neurons in Dissociated Cell Culture is Enhanced by 2-Mercaptoethanol. R.J. GRILL AND S.K. PIXLEY. University of Cincinnati.

P4 #240 Glutathione in the Olfactory Epithelium. C.L. KIRSTEIN, R.J. BRIDGES, R. COOPERSMITH AND M. LEON. *University of California, Irvine.* 

P5 #241 Localization of the Cyanide Metabolizing Enzyme, Rhodanese, with the Olfactory Epithelium. J.L. LEWIS, C.E. RHOADES, D.E. BICE, J.R. HARKEMA, J.A. HOTCHKISS AND A.R. DAHL. Lovelace Inhalation Toxicology Research Institute.

P6 #242 Effect of Olfactory Epithelial Regeneration and Cage Environment on the Sensitivity of the Rat Olfactory Epithelium to Methyl Bromide. BRAD BOLON, MARC BONNEFOI, KEVIN T. MORGAN. Chemical Industry Institute of Toxicology.

P7 #243 Effects of Unilateral Naris Closure on the Olfactory Epithelia of Adult Mice. JOEL MARUNIAK, JEFF HENEGAR AND T.P. SWEENEY. University of Missouri.

P8 #244 Two-Dimensional Models and Morphometry of Individual Olfactory Conchae in Growing rats. MICHAEL SICHLAU, MARK PATERNOSTRO AND ESSIE MEISAMI. *University of Illinois.* 

### **OLFACTORY TRANSDUCTION**

P9 #245 Voltage-Dependent and Stimulus-Activated Membrane Currents in Isolated Olfactory Neurons of the Channel Catfish (Ictalurus punctatus). TAKENORI MIYAMOTO, DIEGO RESTREPO AND JOHN H. TEETER. Monell Chemical Senses Center.

P10 #246 Mechanism of Olfactory Signal Transduction in Primary Cultures of Rat Olfactory Neurons. GABRIELE V. RONNETT, LYNDA D. HESTER, SOLOMON H. SNYDER. Johns Hopkins University.

P11 #247 Activation of Inositol-Phosphate Metabolism in Primary Olfactory Cell Cultures. SUSAN F. WOOD, GABRIELE V. RONNETT, AND SOLOMON H. SNYDER. Johns Hopkins University.

P12 #248 Dynamics of Cyclic AMP Regulation in Olfactory Cell Lines. FELICE F. BORISY, GABRIELE V. RONNETT, SOLOMON H. SNYDER. Johns Hopkins University. RENE HEN. Columbia University.

P13 #249 Odorant Binding Protein: Possible Binding Site and Multiple Sites of Production. A.A. KHAN AND S.H. SNYDER. Johns Hopkins University.

P14 #250 Responses in Slices of Olfactory Epithelium Visualized with Voltage Sensitive Dyes and Video Image Analysis. J.N. BROUWER, P. FARMER, C.S. LUO AND R.C. GESTELAND. University of Cincinnati.

P15 #251 Olfactory Receptor Processes. HANS BREER, Stuttgaard

### OLFACTION: CENTRAL PATHWAYS

P16 #252 Biophysical Properties of Amphibian Olfactory Receptor Axons: Semi-Quantitative Analysis Using Optical Recording Techniques. RAYMOND GALINDO, PATRICK NASH, DAVID SENSEMAN AND SYLVIA VASQUEZ. University of Texas at San Antonio.

P17 #253 Examination of the Lineage of Adult Olfactory Receptors by Autoradiography and Intracellular Injection of Vital Dyes. M.A. SCHWARTZ AND J.S. KAUER. New England Medical Center

P18 #254 Voltage-sensitive Dye Recordings from the Salamander Olfactory Bulb after Global and Local Odor Stimulation. A.R. CINELLI AND J.S. KAUER. New England Medical Center

P19 #255 Distribution of Globuli Cell Dendritic Arbors in The Crayfish Olfactory Midbrain. DE FOREST MELLON, JR. AND VINESSA ALONES. University of Virginia.

P20 #256 Serotonin in the Central Olfactory System of the Spiny Lobster. M. SCHMIDT, E. ORONA, S. WAECHTER, B.A. BATTELLE AND B.W. ACHE. University of Florida.

P21 #257 Pharmacological and Physiological Evidence for Histamine as a Neurotransmitter in the Olfactory CNS of the Spiny Lobster. E. ORONA AND B.W. ACHE. *University of Florida*.

P22 #258 Differential Synaptic Processing on Apical Versus Lateral Mitral/Tufted Cell Dendrites. M.T. SHIPLEY. University of Cincinnati. D.S. ZAHM. St. Louis University.

P23 #259 Somatostatin-like Immunoreactivity in the Rat Accessory and Main Olfactory Bulbs. SHIGERU TAKAMI AND PASQUALE P.C. GRAZIADEI. Florida State University. MISBAH S. EL-HAWARY. Assiut University.

P24 #260 Pharmacological Characterization of Dopamine Receptors in the Olfactory Bulb. WILLIAM T. NICKELL, ANDREW B. NORMAN AND MICHAEL T. SHIPLEY. *University of Cincinnati.* 

P25 #261 Comparison of GABA-like Immunoreactivity in the Salamander Olfactory Bulb Using Two Antisera. K.A. HAMILTON. Louisiana State University.

P26 #262 GABAergic Modulation of EEG and Evoked Potentials In The Rat Olfactory Rat. BARRY K. RHOADES AND WALTER J. FREEMAN. University of California, Berkeley.

P27 #263 Modulation of Olfactory Seizures by Valproate and Pentylene Tetrazol. BARRY K. RHOADES, EDMUN W. LEO AND WALTER J. FREEMAN. University of California, Berkeley.

P28 #264 Intracellular Recordings of Rat Olfactory Bulb Interneurons. DAVID P. WELLIS AND JOHN W. SCOTT, Emory University School of Medicine.

P29 #265 Olfactory Discrimination Learning is Unimpaired Following Depletion of Norepinephrine in the Cortex and Olfactory Bulbs by Injection of 6-Hydroxydopamine Into the Dorsal Noradrenergic Bundle. LOREDANA M. HARRISON AND ROBERT G. MAIR. University of New Hampshire.

P30 #266 Saliency of Olfactory Cues: The Blocking Phenomena. L. HASTINGS AND J. EVANS. University of Cincinnati.

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