STEVEN JAMES ST. JOHN

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EDUCATION

May, 1993	B.S.*	Neurobiological Sciences	University of Florida
May, 1995	M.S.	Psychobiology	University of Florida
August, 1997	Ph.D.	Psychobiology	University of Florida

* With highest honors

PROFESSIONAL EXPERIENCE

July, 2006 – present: Associate Professor of Psychology, Rollins College

Courses: Physiological Psychology, Brain and Behavior, Statistics and Research Methods II, Introduction to Psychology, Neuropsychology, The Mind-Body Problem, This Is Your Brain on Music.

Research focus: Perceptual consequences of salt appetite, role of components of intercellular signaling in taste buds on perception, and behavioral-genetic analyses of licking behavior and taste perception in mice.

August 2005 – June 2006: Associate Professor of Psychology, Reed College

Courses: Introduction to Psychology, Psychobiology, Neural Plasticity, Psychobiology Research, Psychobiology of Consciousness, Thesis.

Research focus: Continuing studies on linking animal psychophysics to neural recordings in the gustatory system.

August 2001 – August 2005: **Assistant Professor of Psychology, Reed College**

Responsibilities as above.

August 1997 – August 2001: **Postdoctoral Fellow, University of Maryland School of Medicine**

Courses: Neuroscience's Greatest Hits: The Nobel Prize Winners.

Research focus: Under the direction of David V. Smith, neurophysiological correlates of gustatory discrimination, factors determining taste bud phenotype, mouse strain differences in taste perception.

August 1993 – August 1997: Predoctoral Fellow and Graduate Assistant, University of Florida

Courses: Physiological Psychology.

Research focus: Under the direction of Alan C. Spector, the peripheral organization of the gustatory system, role of saliva in taste, functional recovery and regeneration of cranial nerves, gustatory controls of feeding behavior.

COURSES TAUGHT

2008-2009

Physiological Psychology	16 enrolled
Statistics and Research Methods II	15
This Is Your Brain On Music	39
The Mind-Body Problem	20
Independent Study	1

2007-2008

Introduction to Psychology	26
Neuropsychology – 2 sections	48
Statistics and Research Methods II	19
Physiological Psychology	22
Independent study	2

2006-2007

Introduction to Psychology	25
Physiological Psychology – 2 sections	49
Brain-Behavior Connection	23

2005-2006

Psychobiology Research	8
Neural Plasticity	10
Psychobiology	26
Introduction to Psychology	88
Thesis	3

2004-2005

The Psychobiology of Consciousness	26
Psychobiology	24
Introduction to Psychology	80
Thesis	3

2003-2004

Psychobiology	30
Introduction to Psychology	82
Thesis	3

2002-2003

Psychobiology Research	6
Neural Plasticity	11
Psychobiology	37
Introduction to Psychology	90
Thesis	3

2001-2002

Psychobiology Research	13
Developmental Psychobiology and Neural Plasticity	15
Psychobiology	35
Introduction to Psychology	85

Thesis	4
2000-2001	
Neuroscience's Greatest Hits: The Nobel Prize Winners	9
1995-1996	
Physiological Psychology	25

UNDERGRADUATE THESES MENTORED

1. Evan Vickers (2002). Computational Modeling of the Active Electrosensory System in a Weakly Electric Fish, *Gnathonemus petersii*.
2. Caroline Dombrowski (2002). Effects of Daytime Melatonin Injections on Circadian Water Consumption in Mice.
3. Kris Pethtel (2002). A Taste Aversion Model of Acupuncture's Ability To Alleviate Nausea.
4. Jessica Knowles (2002). A Behavioral Study of Delta-Opiod Sub-Type Receptors in Ethanol Reward.
5. Matt Guertin (2002). Nitric Oxide and Learning in Bees.
6. Mica Marquez (2003). Mornings Are Distasteful: Circadian Susceptibility to Acquisition of a Conditioned Taste Aversion.
7. Jose Guillen (2003). Don't Talk Until You Can See the Whites of Their Eyes.
8. Jason Meinzer (2004). Sleep and Motor Skill Learning.
9. Gus Kampf-Lassin (2004). Gustatory Detection of Fatty Acids.
10. Annie Block (2004). On the Time Course of Conditioned Taste Aversion: Transient Inter-Chemical Generalization.
11. Joe Rancourt (2005). To Taste or Not to Taste? Human Fatty Acid Perception.
12. DeAnna Duffield (2005). Why Don't You Like What You Like? Modulating Factors in the Anticipatory Contrast and Conditioned Flavor Preference Paradigms.
13. Roni Tubman (2005). The Taste of Science: How Sweet Can It Be?
14. Matthew O'Sullivan (2006). Environmental Influences on Developmental and Adult Injury-Induced Plasticity: Effects of Dietary Sodium Restriction During Early Development and Chorda Tympani Regeneration on Salt Taste Behavior.
15. David Gatta (2006). The Differential Effects of Oleoethanolamide on Ingestive Behavior In Free-Feeding Rats.
16. Chris Breese (2006, co-advisor with Enriqueta Canseco-Gonzalez). Acquired Magnetosensation: Demonstration of the Phenomenon in Rats
17. Erin Krauskopf (2008). Transgenic $P2Y_4$ knockout mice are insensitive to the taste of NaCl: Implications for intragemmal circuitry in taste buds.
18. Anya Marshall (2008). Na_2CO_3 tastes ten times stronger than NaCl to salt-deprived rats.
19. Danielle Martin (2009). Salt taste perception in knockout mice lacking $P2Y_4$ purinergic neurotransmitter receptors.

FUNDING

As Principal Investigator

Student-Faculty Collaborative Research Program, mentor of Danielle Martin, Summer, 2008

National Institutes of Health Academic Research Enhancement Award, July, 2004 – June, 2008, "Taste Quality Coding Of Salts" ($213,638)

Paid Leave Award, Reed College, Spring, 2004 (Awarded Fall, 2002), "Role of Amiloride-Sensitive Neurons in Salt Taste Coding" (Full salary for one semester)

Levine Fund Award (in service of Paid Leave), Spring, 2004 ($1000)
Medical Research Foundation of Oregon, December 2003-December 2004, “The Taste Of Fats” ($27,000)
Mellon Faculty Partnership (Faculty Partner: John D. Boughter, PhD, University of Tennessee Health Science Center), 2004-2005 ($2355)
Faculty Partner, Mellon Faculty Partnership awarded to John-Paul Baird, PhD, 2004-2005 ($2500)
Stillman-Drake Award, 2003, “Genetics of Neural Pattern Generators” ($1000)
Co-Investigator (with John-Paul Baird, PhD, Amherst College), Mellon Summer Research Stipend, Summer, 2003, "Effects of parabrachial nucleus lesions on the rapid formation of conditioned taste aversions" ($8,000)
Murdock Faculty Development Grant, 2002 ($1500)
Sherman-Fairchild Mentor, 2004-2005 of Leila Kalmbach, James McCollum, Lana Chisholm, David Gatta
HHMI Mentor, 2002 of Lee Hallagan
NSF AIRE Mentor, 2002 of Sara Saperstein

As Postdoctoral Fellow

Postdoctoral Fellow (Training Program in Chemosensory Neuroscience, NIDCD; July, 1998 – 2001)
Postdoctoral Fellow (Dr. David V. Smith, mentor; August, 1997 - July, 1998)

As Predoctoral Student

National Science Foundation Graduate Fellow (May, 1994 - May, 1997)
Teaching Assistant (January 1996 - May 1996)
Grinter Fellow (August 1993 - May 1996)
College of Liberal Arts and Sciences Fellow (August 1993 - May, 1994)

As Undergraduate Student

Florida Academic Scholar (1989-1991)
National Merit Scholar (1989-1991)

PROFESSIONAL AFFILIATIONS

Association for Chemoreception Sciences (AChemS) since 1993.

PROFESSIONAL AND COLLEGE SERVICE

Review Service

Ad Hoc Reviewer for *American Journal of Physiology*, 2009
Ad Hoc Reviewer for *Brain Research*, 2007
Invited Reviewer for a Special Issue of *Journal of Consciousness Studies*, 2004
Ad Hoc Reviewer for NSF RUI proposal, 2002
Ad Hoc Reviewer for *Chemical Senses*, 2001 – 2009
Ad Hoc Reviewer for *Behavioral Neuroscience*, 2006
Ad Hoc Reviewer for *Physiology & Behavior*, 2001, 2004, 2005, 2008, 2009
Ad Hoc Reviewer for NSF MRI proposal, 2001

Organization Service

Member, Program Committee, AChemS, 2005-2008

Service to Rollins College

Committees

Member, Academic Affairs Committee, 2008-2010
Member, New Course Subcommittee, AAC New Course Subcommittee, 2008-2010
Member, Institutional Animal Care and Use Committee, 2006-present
Member, Proposal Review Committee, Summit For Transforming Learning, 2008
Member, New Science Building Workshop Group, 2008
Member, Stephen Pinker Faculty Team, Rollins Colloquy, 2007

Websites and E-Zines

Editor and Publisher, Psychology Department Newsletter, 2008-present
Webmaster, Psychology Department Website, 2008-present
Webmaster, Child Development Center, 2009
Website planning, Academic Affairs Committee, 2009

Student Group Advising

Advisor, Psi Chi Honor Society, Rollins College Chapter, 2007-2009

College Service (Former Institutions)

Organized senior events, 2005-2006
Human Subjects Committee, 2005-2006
Animal Care & Use Committee, 2002-2006
Reed College Bookstore Board, 2004-2005
Administered departmental Junior Qualifying Exam, 2002-2005
Attendee, Squier Retreat, 2002-2005
Reed College Academic Services Committee, 2002-2003
Organized senior thesis poster session, 2001-2004
Maintained departmental web site, 2001-2003

Other Service

Panelist, Career Strategies Session, Professional Skills Retreat for University of Miami graduate students studying in biomedical fields, June 19, 2009.
Panelist, Career Strategies Session, Professional Skills Retreat for University of Miami graduate students studying in biomedical fields, June 13, 2008.
Panelist, Career Strategies Session, Professional Skills Retreat for University of Miami graduate students studying in biomedical fields, June 22, 2007.

INVITED SEMINARS AND SYMPOSIA

Searching For My Lost Shaker Of Salt. Program In Neuroscience Lecture Series, Wofford College, Spartanburg, South Carolina, September 18, 2008.

Behavioral Analysis of Salt Taste. Linguagen Corporation (now Redpoint Bio), Cranbury, NJ, February, 2006.

Processing and Modulation at Multiple Levels of the Taste System. Gordon Research Conference, Chemical Senses: Taste & Smell, New London, NH, July 6-11, 2003. Invited Discussant.

Behavioral Analysis Of Chemosensory Function. AChemS XXIV, Sarasota, FL, April26, 2002. Invited Discussant.

Neuronal Cell Types and Taste Quality Coding. (With JD Boughter and presented by DV Smith.) Festschrift in Honor of Robert Erickson, Duke University, July, 1999.

Taste Quality Coding Of Salts In Rats: Electrophysiological and Behavioral Analysis. University of Pennsylvania Feeding Seminar, April 9, 1999.

Taste Quality Coding Of Salts In Rats: Electrophysiological and Behavioral Analysis. Wake Forest

University, Department of Anatomy and Neurobiology, January 8, 1999.

Neural Representation of Salts In The Hamster Solitary Nucleus: Implications For Taste Quality Coding. Hopkins-Maryland Smell and Taste Colloquium, March 9, 1998.

PUBLICATIONS

Undergraduate coauthors are indicated by underlining.

In preparation

1. **St. John SJ**, Krauskopf E, Marshall A, Martin D, Roper SD. Transgenic $P2Y_4$ knockout mice have subtle NaCl taste deficits: Implications for intragemmal circuitry in taste buds.

2. **St. John SJ**, Marshall A, Krauskopf E**.** Perceptual consequences of salt need in rats.

3. Boughter JD, **St. John SJ**, Heck DH, Williams RW, Lu L. Genetic control of the central pattern generator for fluid licking in mice.

4. Boughter JD, **St. John SJ**, Bajpai T, Roy S, Lu L, Williams RW, Heck DH. Genetic variance underlies oromotor phenotypes: A survey of licking and ingestive phenotypes in 18 isogenic strains.

Book Chapters and Peer-Reviewed Review Articles

1. **St. John SJ,** Boughter JD (2008). The Gustatory System (chapter 25). In: *Neuroscience in Medicine*, 3rd Ed., Ed: Conn PM, Humana Press, Towata, N.J.

2. **St. John SJ,** Spector AC (2008). Behavioral Analysis Of Taste In Rodent Models. In: Allan I. Basbaum, Akimichi Kaneko, Gordon M. Shepherd and Gerald Westheimer, editors. *The Senses: A Comprehensive Reference, Vol. 4, Olfaction & Taste,* Ed: Firestein S, Beauchamp GK. San Diego, Academic Press.

3. Smith DV, **St. John SJ,** Boughter JD (2003). The Gustatory System. In: *Neuroscience in Medicine*, 2nd Ed., Ed.: Conn, P.M., Humana Press, Towata, N.J.

4. Smith DV, **St. John SJ**, Boughter JD (2000). Neuronal cell types and taste quality coding. *Physiology and Behavior*, 69, 77-85.

5. Smith DV, **St. John SJ** (1999). Neural coding of gustatory information. *Current Opinion In Neurobiology,* 9, 427-435.

Published Peer-Reviewed Research Articles

1. **St. John SJ**, Boughter JD (2009). Orosensory responsiveness to and preference for hydroxide-containing salts in mice. *Chemical Senses, 34*, 487-498.

2. Boughter JD, Baird JP, Bryant J, **St. John SJ**, & Heck DH (2007). C57BL/6J and DBA/2J mice vary in lick rate and ingestive microstructure. *Genes, Brain, and Behavior, 6,* 619-627.

3. Baird JP, **St. John SJ**, Nguyen EA (2005). Temporal and qualitative dynamics of conditioned

taste aversion processing: combined generalization testing and licking microstructure analysis. *Behavioral Neuroscience,* 119, 983-1003.

4. **St. John SJ**, Pour L, Boughter JD (2005). Phenylthiocarbamide produces conditioned taste aversions in mice. *Chemical Senses,* 30, 377-382.

5. **St. John SJ**, Hallagan L (2005). Psychophysical investigations of cetylpyridinium chloride in rats: Its inherent taste and modifying effects on salt taste. *Behavioral Neuroscience,* 119, 265-279.

6. **St. John SJ**, Boughter JD (2004). The contribution of taste bud populations to bitter avoidance in mouse strains differentially sensitive to sucrose octa-acetate and quinine. *Chemical Senses*, 29, 775-787.

7. **St. John SJ**, Garcea M, Spector AC (2003). The time course of taste bud regeneration after glossopharyngeal or greater superficial petrosal nerve transection in rats. *Chemical Senses,* 28, 33-43.

8. Boughter JD, **St. John SJ**, Noel DT, Ndubuizu O, & Smith DV (2002). A brief access test for bitter taste in mice, *Chemical Senses,* 27, 133-142.

9. **St. John SJ**, Smith DV (2000). Neural representation of salts in the rat solitary nucleus: brain stem correlates of taste discrimination. *Journal of Neurophysiology.* 84, 628-638.

10. Boughter JD, **St. John SJ**, Smith DV (1999). Neural representation of the taste of NaCl and KCl in gustatory neurons of the hamster solitary nucleus, *Journal of Neurophysiology,* 81, 2636-2646.

11. Smith DV, Som J, Boughter JD, **St. John SJ**, Yu C, Christy RC (1999). Cellular expression of α-gustducin and the A blood group antigen in rat fungiform taste buds cross-reinnervated by the IXth nerve, *Journal of Comparative Neurology*, 409, 118-130.

12. Markison S, **St. John SJ**, Spector AC (1999). Glossopharyngeal nerve transection reduces quinine avoidance in rats not given presurgical stimulus exposure. *Physiology & Behavior,* 65, 773-778.

13. **St. John SJ**, Spector AC (1998). Behavioral discrimination between quinine and KCl is dependent upon input from the seventh cranial nerve: Implications for the functional roles of the gustatory nerves in rats. *Journal of Neuroscience*, 18, 4353 - 4362.

14. Spector AC, **St. John SJ** (1998). Role of taste in the microstructure of quinine ingestion by rats. *American Journal of Physiology*, 274, R1687 - R1703.

15. Chappell JP, **St. John SJ**, Spector AC (1998). Amiloride does not alter NaCl avoidance in Fischer-344 rats. *Chemical Senses*, 23, 151 - 157.

16. **St. John SJ**, Markison S, Guagliardo NA, Hackenberg TD, Spector AC (1997). Chorda tympani transection and selective desalivation differentially disrupt two-lever salt discrimination in rats, *Behavioral Neuroscience*, 111**,** 450 - 459.

17. Spector AC, Markison S, **St. John SJ**, Garcea M (1997). Sucrose vs. maltose taste discrimination by rats depends on the input of the seventh cranial nerve, *American Journal of*

Physiology, 272*,* R1210 - R1218.

18. **St. John SJ**, Markison S, Spector AC (1997). Chorda tympani transection disrupts taste aversion learning to potassium chloride, but not sodium chloride, *Behavioral Neuroscience*, 111**,** 188 - 194.

19. **St. John SJ**, Spector AC (1996). Combined glossopharyngeal and chorda tympani nerve transection elevates quinine detection thresholds in rats. *Behavioral Neuroscience*, 110**,** 1456 - 1468.

20. Spector AC, Guagliardo NA, **St. John SJ** (1996). Amiloride disrupts NaCl versus KCl discrimination performance: implications for salt taste coding in the rat, *Journal of Neuroscience*, 16, 8115-8122.

21. Markison S, **St. John SJ**, Spector AC (1995). Glossopharyngeal nerve transection does not compromise the specificity of taste-guided sodium appetite in rats. *American Journal of Physiology*, 269, R215-R221.

22. **St. John SJ**, Markison S, Spector AC (1995). Salt discriminability is related to number of regenerated taste buds after chorda tympani nerve transection in rats. *American Journal of Physiology*, 269, R141-R153.

23. **St. John SJ**, Garcea M, Spector AC (1994). Combined, but not single gustatory nerve transection substantially alters taste-guided licking behavior to quinine in rats. *Behavioral Neuroscience*, 108, 131-140.

CONFERENCE PRESENTATIONS

Undergraduate coauthors are indicated by underlining. Abstracts published in the journal *Chemical Senses* refer to presentations at the Association for Chemoreception Sciences annual meeting. Abstracts published in *Obesity Research* refer to presentations at the Society for the Study of Ingestive Behavior annual meeting. IBANGS refers to the International Behavioural and Neural Genetics Society.

1. **St. John SJ**, Marshall A, Krauskopf E (2009). The perceptual consequences of salt appetite in rats, *Chemical Senses, abstract publication forthcoming*.

2. Boughter JD, Bajpai T, **St. John SJ**, Williams RW, Lu L, Heck DH (2008). Genetic analysis of fluid licking in inbred and BXD recombinant inbred mice. IBANGS.

3. Boughter JD, Bajpai T, **St. John SJ**, Williams RW, Lu L, Heck DH (2007). Genetic analysis of oromotor movements in inbred and BXD recombinant inbred mice. *Society for Neuroscience.*

4. Boughter JD, Baird JP, **St. John SJ**, Williams RW, Lu L, Heck DH. (2006). Genetic basis of lick rate and lick microstructure in mice. IBANGS.

5. Baird JP, **St. John SJ**, Boughter JD (2005). Differences in licking microstructure between c57bl/6j and dba/2j mice: implications for the genetic controls of lick pattern generation and the burst-pause structure of licking. Program No. 281.10. *Abstract Viewer/Itinerary Planner. Washington, DC: Society for Neuroscience*, Online.

6. Boughter JD, Pour L, Shank AJ, **St. John SJ** (2005). Mouse strains show differences in intake of alkalines. *Chemical Senses, 30(5),* A171.

7. Baird JP, **St. John SJ**, Nguyen EA (2005). Rats form taste-nausea associations in 8 minutes: New methods to explore the temporal and qualitative dynamics of conditioned taste aversion processing. *Chemical Senses, 30(5),* A171.

8. **St. John SJ** (2005). Amiloride-adulterated NaCl tastes like KCl and Na gluconate tastes like NaCl to the Na-depleted rat. *Chemical Senses, 30(5),* A190.

9. Baird JP, **St. John SJ**, Nguyen EA (2005). Microstructural analysis of licking in the formation and extinction of a conditioned taste aversion, *Chemical Senses, 30(3),* A91. (Presentation published in 2005; presentation made in 2004.)

10. Raghow SR, Nelson TM, Munger SD, **St. John SJ**, and Boughter, J.D. Jr. Gustatory and behavioral differences between C57BL/6J and DBA/2J inbred mice. *Chemical Senses, 30(3),* A91. (Presentation published in 2005; presentation made in 2004.)

11. Boughter JD, **St. John SJ**, Williams RW, Lu L. (2004). Genetic control of lick rate in mice, *Chemical Senses, 30(3),* A106. (Presentation published in 2005; presentation made in 2004.)

12. Hallagan L, Saperstein S, **St. John SJ** (2003). Cetylpyridinium chloride's aversive taste to rats. *Chemical Senses, 28,* A91.

13. **St. John SJ**, Garcea M, Spector AC (2002). Time-course of taste bud regeneration after transection of the glossopharyngeal and greater superficial petrosal nerves in the rat. *Chemical Senses,* 27*,* A57

14. Ndubuizu O, **St. John SJ**, Smith DV, Boughter JD (2001). The effects of IXth nerve transection on short-term taste responses to bitter tasting stimuli in inbred and congenic mice. *Chemical Senses,* 26, 1037.

15. Smith DV, Zhang H, Boughter JD, **St. John SJ**, Gilbertson TA (2000). Distribution of gustatory sensitivities to four basic stimuli across rat taste receptor cells and brainstem neurons. *Chemical Senses*, 25, 661.

16. **St. John SJ**, Smith DV (2000). Sodium gluconate stimulates amiloride-insensitive neurons in the rat solitary nucleus. *Chemical Senses*, 25, 679-680.

17. **St. John SJ**, Smith DV (1999). Salt taste discrimination by rats depends upon differential responses across gustatory neuron types. *Chemical Senses* 24, 547-548.

18. **St. John SJ**, Boughter JD, Smith DV (1998). The role of amiloride-sensitive and -insensitive mechanisms in NaCl- and KCl-evoked responses in the hamster solitary nucleus. *Chemical Senses*, 23, 550.

19. Som J, Boughter JD, **St. John SJ**, Yu C, Christy RC, Smith DV (1998). Cellular expression of α-gustducin and the A blood group antigen in rat fungiform taste buds cross-reinnervated by the IXth nerve. *Chemical Senses*, 23, 594.

20. **St. John SJ**, Spector AC (1997). The effect of gustatory nerve transection on taste discriminations involving quinine in rats. *Chemical Senses*, 22, 800.

21. **St. John SJ**, Markison S, Guagliardo NA, Hackenberg TD, Spector AC (1996). Chorda tympani nerve transection and partial desalivation differentially disrupt two-lever salt discrimination performance in rats. *Chemical Senses*, 21, 675.

22. Markison S, **St. John SJ**, Spector AC (1996). Unconditioned licking of quinine is increased by glossopharyngeal nerve transection in rats without presurgical stimulus exposure. *Chemical Senses*, 21, 639.

23. Spector AC, Markison S, **St. John SJ**, Selvig LA, Garcea M (1996). The effects of gustatory nerve transection on conditioned sugar discrimination in the rat. *Chemical Senses*, 21, 674.

24. Spector AC, **St. John SJ**, Klumpp PA (1995). Patterns of quinine licking in rats: contribution of lingual taste buds. *Obesity Research*, 3, 384s.

25. **St. John SJ**, Spector AC (1995). Combined glossopharyngeal and chorda tympani nerve section profoundly raises quinine detection thresholds in rats. *Obesity Research*, 3, 328s.

26. **St. John SJ**, Spector AC (1995). Chorda tympani or glossopharyngeal nerve transection does not alter quinine detection thresholds in rats. *Chemical Senses*, 20, 785.

27. **St. John SJ**, Markison S, Spector AC (1994). Salt discrimination before and after rat chorda tympani regeneration. *Chemical Senses*, 19, 560.

28. **St. John SJ**, Markison S, Spector AC (1994). Relationship of taste bud regeneration and salt discrimination performance after chorda tympani transection in rats. *Abstracts of the Society for Neuroscience*, 20, 981.

29. Markison S, **St. John SJ**, Spector AC (1994). Glossopharyngeal nerve transection does not compromise cation specificity of depletion-induced sodium appetite in rats. *Chemical Senses*, 19, 513.

30. Spector AC, **St. John SJ** (1993). Performance deficits in conditioned taste aversion and salt discrimination caused by lesions in the parabrachial nuclei. *Abstracts of the Society for Neuroscience*, 19, 1281.

31. **St. John SJ**, Garcea M, Spector AC (1993). The effects of gustatory nerve section on concentration-dependent licking to quinine in rats. *Chemical Senses*, 18, 635.