

THE SIXTH ANNUAL
JAMES C. SMITH LECTURE



***Department of Psychology
and the Program in Neuroscience,
College of Arts and Sciences***

Friday, February 28, 2014
Psychology Building Auditorium

The Sixth Annual James C. Smith Lecture

Welcome and
Introductory Remarks

Dr. Sam Huckaba
Dean, College of Arts & Sciences
Florida State University

Introduction of Speaker

Dr. Alan C. Spector
Professor of Psychology and Neuroscience
Florida State University

The Search for Sweet

Ralph Norgren, Ph.D.

Distinguished Professor of Neural and Behavioral Sciences
College of Medicine, The Pennsylvania State University

About the speaker



Ralph Norgren, Ph.D.

Ralph Norgren received a B.A. in Psychology from the University of Pennsylvania (1965). In his senior year he did research with Paul Rozin and worked for Phillip Teitelbaum. From Penn he went to the University of Michigan to do graduate work in the laboratory of James Olds. After receiving a Ph.D. at Michigan (1969), he did postdoctoral work at The Rockefeller University with Carl Pfaffmann. From Rozin he learned that research could be fun, even playful. Teitelbaum advised him to study big effects, particularly in psychology. Olds taught him that history was as important in science as in any other endeavor. Olds also proved to him that benign neglect could be as important in educating a scientist as careful guidance. Carl Pfaffmann formalized Olds's style. Both provided the resources for research, an open but protected environment, and then set their students free. Pfaffmann added rigorous feedback. After this formal training, Norgren continued to learn from his students – 36 postdoctoral fellows and 3 graduate students – and from collaborators in the USA, Europe, and Japan.

Dr. Norgren remained on the faculty of The Rockefeller University until 1983 when he moved to the College of Medicine of The Pennsylvania State University where he is currently University Distinguished Professor of Neural and Behavioral Sciences. Since 1966 his research has been continuously funded by the National Institutes of Health with additional grants from the National Science Foundation and the State of Pennsylvania. He received

three NIMH Career Scientist Awards, two NIH Fogarty International Fellowships for research in France, and two fellowships from Japan for research sojourns there. He was elected President of the Society for the Study of Ingestive Behavior and President of the Faculty Organization of the Penn State College of Medicine. He received an Honorary Doctorate from the Toyama Medical and Pharmaceutical University (Japan), a Claude Pepper Award from the NIDCD, an Award for Research in Taste from the Association for Chemoreception Sciences, the Manheimer Award from the Monell Chemical Senses Center, the Howard Palmer Faculty Mentoring Award (Penn State), and the Postdoctoral Mentoring Award from the Penn State University College of Medicine. He served for more than a decade on NIH Study Sections. Norgren is an author of 140 articles, chapters, and edited volumes.

As a graduate student Norgren became interested in the reward produced by natural sensory stimuli, specifically taste. At the time, the neural seat of reward was in the hypothalamus. Thus, the question was reduced to how gustatory sensory activity reaches that area in the ventral forebrain. Norgren's thesis research demonstrated that neurons in the hypothalamus responded to tastes but the activity differed from that observed in gustatory relays in the brain. This fact beggared the question of how taste activity reached the hypothalamus. When he moved to the Rockefeller University, he and Dr. Christiana M. Leonard produced the first complete anatomical description of central gustatory system in mammals. This description led to the discovery of gustatory and visceral afferent neurons in the pontine parabrachial nuclei. In rodents, the parabrachial nuclei are obligate relays for the gustatory thalamocortical system. More importantly, Norgren determined that the parabrachial nuclei also project directly to the limbic system including the hypothalamus, which controls motivation, emotions, and reward.

In further research, Norgren investigated the sensory code for taste in awake, behaving animals and demonstrated that gustatory neural activity was altered during motivated states such as hunger and sodium appetite. He and Dr. Harvey Grill also established the brainstem neural circuitry responsible for the primary behavior driven by taste – ingestion or rejection. Part of this work utilized chronically decerebrate rats to demonstrate that the brainstem was capable of integrating gustatory, visceral, and endocrine signals into coordinated ingestion and rejection behavior. One result of this series of publications was to refocus many other investigations of feeding behavior from the hypothalamus to the hindbrain.

Despite this considerable and unsuspected capacity to produce appropriate behavior, the chronically decerebrate rat is incapable of learning or of responding to some immediate motivational signals, such as an electrolyte imbalance. This prompted a series of studies on the functions of the central gustatory relays. It turned out that the relays in the medulla, pons, and thalamus play distinct roles in processing taste information. Lesions of the pontine

parabrachial nuclei, the second central gustatory relay, block the acquisition of a learned taste aversion and the expression of sodium appetite. Damage to either the first central relay in the medulla or to the thalamic taste area has little or no effect on these behaviors. Because the parabrachial nuclei project to the limbic system as well as the thalamus, these data support the hypothesis that taste-guided ingestive behaviors are more dependent on this ventral forebrain interaction than on thalamocortical processing. Subsequent research in Norgren's laboratory using neurochemical and immunohistochemical techniques determined that these parabrachial-limbic gustatory projections also reach the neural systems that support reward and aversion. These systems include the hypothalamus but extend throughout the brain

The James C. Smith Lectureship Series

Established by a generous gift from Mr. Stan and Mrs. Paula Warmath, long-time friends and associates of Dr. James C. Smith, the annual lecture features an invited internationally renowned speaker who is conducting behaviorally oriented research on scientific problems in neuroscience. The Warmaths' gift, coupled with continuing donations from other friends, former students, and colleagues of Dr. Smith, as well as support from the Department of Psychology and the Program in Neuroscience, provides the opportunity for FSU faculty and students to interact with these distinguished scholars during their visits to campus.

If you are interested in contributing to the James C. Smith Lecture Endowment then please contact Nancy Smilowitz (nsmilowi@fsu.edu; 850-644-9324) in the College of Arts and Sciences for more information.

James C. Smith, Ph. D.



James C. Smith, Ph.D.

After he earned his Ph.D. from Florida State University in 1959, Dr. Smith joined the faculty, and since that time has received every award that the university has to offer. In 1992 Smith was named a Robert O. Lawton Distinguished Professor, the highest award bestowed upon a faculty member by the University. Smith was also the recipient of the University Distinguished Teacher Award based on a lifetime of teaching excellence, and in 2005 the College of Arts and Sciences honored Dr. Smith as their Graduate of Distinction. Dr. Smith has also received international recognition for his scientific achievements including The Distinguished Career Award from the Society for the Study of Ingestive Behavior, a National Sigma Xi Lectureship, and the Mozell Award for Outstanding Achievement in the Chemical Senses from the Association for Chemoreception Sciences. After 52 years on the Department of Psychology faculty, Dr. Smith retired but still remains active in research at FSU as Professor Emeritus.