

## BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors.  
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME Morrison, Edward E.	POSITION TITLE Professor and Head		
eRA COMMONS USER NAME			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
University of Massachusetts, Amherst, MA,	BS	1970	Zoology
Kansas State University, Manhattan, KS	MS	1976	Reproductive Endocrinology
Kansas State University, Manhattan, KS,	PhD	1980	Anatomy/Physiology

Please refer to the application instructions in order to complete sections A, B, and C of the Biographical Sketch.

### **POSITIONS AND EMPLOYMENT**

- 1976-1982 Instructor (Full time, 9 month; non tenure track), Division of Biology, T.C. Johnson, Chairman, Kansas State University, Manhattan, KS.
- 1982-1983 Research Associate (Full time 12 month, non tenure track), Department of Biological Sciences, Advisor P.P.C. Graziadei, Florida State University, Tallahassee, FL.
- 1983-1985 NIH Postdoctoral Fellow (Full time, non tenure track), Department of Biological Sciences, Advisor P.P.C. Graziadei, Florida State University, Tallahassee, FL.
- 1985-1990 Research Assistant Professor (Full time, non tenure track), Department of Physiology, J. Poland, Acting Chairman, Medical College of Virginia, Richmond, VA.
- 1990 -97 Associate Professor (Tenured, 1995), Department of Anatomy and Histology, L.M. Krista, Chairman, Auburn University, AL.
- 1997-2002 Professor, Department of Anatomy, Physiology and Pharmacology, Auburn University, AL
- 2003-present Professor and Head, Department of Anatomy, Physiology and Pharmacology, Auburn University, AL

### **Selected Publications:**

Exploring Pleiotropic Functions of Canine B Defensin 103: Nasal cavity expression, antimicrobial activity and melanocortin receptor activity. Aono, S, Dennis JC, He S, Wang W, Tao YX, Morrison EE, .Anatomical Record, accepted 2019

Is the Mole Rat Vomeronasal Organ Functional? JOHN C. DENNIS,<sup>1</sup> NATALIE K. STILWELL,<sup>2</sup> TIMOTHY D. SMITH,<sup>3,4\*</sup> THOMAS J. PARK,<sup>5</sup> KUNWAR P. BHATNAGAR,<sup>6</sup> AND EDWARD E. MORRISON<sup>1</sup>  
<sup>1</sup>Department of Anatomy, Physiology, and Pharmacology, Auburn University, Auburn, Alabama THE ANATOMICAL RECORD, January 2019

Zinc Nanoparticles Enhance Brain Connectivity in the Canine Olfactory Network: Evidence From an fMRI Study in Unrestrained Awake Dogs Ramaihgari B, Pustovyy OM, Waggoner P, Beyers RJ, Wildey C, Morrison E, Salibi N, Katz JS, Denney TS, Vodyanoy VJ, Deshpande G.. Frontiers in Veterinary Science. 2018, 5(127), 1-9

Anterior-posterior dissociation of the default mode network in dogs. Kyathanahally SP, Jia H, Pustovyy OM, Waggoner P, Beyers R, Schumacher J, Barrett J, Morrison EE, Salibi N, Denney TS, Vodyanoy VJ, Deshpande G. 2015. *Brain Struct Funct* 220(2): 1063-1076.

A Functional MRI Study in Fully Unrestrained Conscious Dogs. Jia H, Pustovyy OM, Wang Y, Waggoner P, Beyers RJ, Schumacher J, Wildey C, Morrison E, Salibi N, Denney TS, Vodyanoy VJ, Deshpande G. Enhancement of Odor-Induced Activity in the Canine Brain by Zinc Nanoparticles: Chemical Senses. 2016;41(1):53-67

AAV mediated gene delivery attenuates neuroinflammation in feline sandhoff disease Bradbury A, Peterson T, Wells S, McCurdy V, Wolfe K, Dennis J, Brunson B, Gray-Edwards H, Randle A, Johnson A, Morrison E, Cox N, Baker H, Sena-Esteves M, Martin D. . *Neuroscience* 340:117-25, 2017

Pancreatic neuronal melanocortin 4 receptor modulates serum insulin levels independent of leptin receptor. Mansour,M, White D, Wernette C,Dennis J, Tao Y, Collins R, Parker L, Morrison EE. *Endocrine* 37:220-230, 2010.

New findings on the vomeronasal complex of platyrrhine primates. T. D. Smith, E. C. Garrett, K.R P. Bhatnagar,C. J. Bonar, A. E. Bruening, J. C. Dennis, and E. E. Morrison. *AAPA* 2011

Odorant response kinetics from cultured mouse olfactory epithelium at different ages in vitro. Viswaprakash N, Josephson E, Dennis J, Yilma S, Morrison EE, Vodyanoy V. *Cell and Tissue Organs* 192:361-373, 2010.

Enhancement of Odorant-Induced Responses in Olfactory Receptor Neurons by Zinc Nanoparticles. Viswaprakash, N., Dennis, J.C., Globa, L., Pustovyy, O., Josephson, E.M., Kanju, P., Morrison, E.E., and Vodyanoy, V.J. (2009). *Chemical Senses* 34, 547-557.

Perinatal Size and Maturation of the Olfactory and Vomeronasal Neuroepithelia in Lorisooids and Lemurooids Smith, TD, Alport, LJ, Burrows, AM, Bhatnagar, KP,Dennis, JC, Tuladhar, P, and EE Morrison (2007) *American Journal of Primatology* 69:74-85

Molecular and functional characterization of bovine beta defensin-1 Aono S, Li C, Zhang G, Kempainen R, Gard J, Lu W, Schwartz D, Morrison E, Dykstra C, Shi J 2006.. *Vet Immunol Immunopathology* 30:746-755.

Reconstruction and morphometric analysis of the nasal airway of the dog (*Canine familiaris*) and implications regarding olfactory airflow Craven B,Neuberger T, Paterson E, Weleb A, Josephson E, Morrison EE, Settles G (2007). *Anat Rec* 290:1325-1340.

Regulation of hepcidin expression by infection and anemia in channel catfish. Hu X, Aono S, Cannes A, Morrison EE, Dennis J, Nusbaum K, Judd R, Shi J (2006) *Comp Immunol Microbiol and Inf Dis* 30:55-69.

A novel role for defensins in intestinal homeostasis: regulation of 1L-1B secretion. Shi J, Aono S, Lu W, Ouellette A, Ji Y, Wang L, Lenz S, Dykstra C, Morrison EE, Elson C (2007) *J Immunol* 179:1245-1253.

Endothelin-1 inhibits adionectin secretion through a phosphatidylinositol 4,5 bisphosphate/actin dependent mechanism. Bedi D, Clarke K, Dennis J, Zhong Q, Brunson B, Morrison EE, Judd R. (2006) *Biochemical and Biophysical Comm* 345:332-339

The vomeronasal organ of greater bushbabies (*Otolemur* spp.): species, sex, and age differences  
Timothy D. Smith, Kunwar P. Bhatnagar, Anne M. Burrows, Kristin L. Shimp, John C. Dennis,  
Matthew A. Smith, Lisette Maico-Tan and Edward E. Morrison (2005) *J. Neurocytol.* 34:135-147

An immunochemical study of GFAP expression in the olfactory bulb and mitosis in the sensory  
epithelium of streptozotocin-induced diabetic rats J.C. Dennis, ES. Coleman, S.E. Swyers, S.W.  
Moody, J.C. Wright, R Judd, and E.E. Morrison (2005). *J. Neurocytol* 35:3-10

RGS2 Inhibits Gs Signaling by Impairing Activation of Type III, V, and VI Adenylyl Cyclases, S.  
Sinnarajah, C.W. Dessauer, D. Srikumar, J. Chen, J.Yuen, J. Dennis, S. Yilma, E. E. Morrison, V.  
Vodyanoy and J. H. Kehrl, *Nature*, 409:1051-1055 2001.

Structure of olfactory epithelium in humans and other vertebrates. *Microscopy Research and  
Technique* 23:49-61. Morrison EE and Costanzo RM, 1992.

Morphology of the human olfactory epithelium Morrison EE and Costanzo RM, 1990. *J  
Comparative Neurology* 297:1-13.

**Patents:** US Patent Application 20130045283 February 21, 2013 Compositions for and methods of  
controlling olfactory responses to odorants. Vodyanoy, Vitaly J., Scharpf, Jr.; Lewis G Samoylov;  
Alexandre Viswaprakash; Nilmini, Globa; Ludmila Petrovna, Morrison; Edward E

US Patent 8778409, Compositions for and methods of controlling olfactory responses to odorants.  
Vodyanoy, Vitaly J., Scharpf, Jr.; Lewis G. Samoylov; Alexandre Viswaprakash; Nilmini, Globa,  
Ludmila Petrovna, Morrison; Edward E 2014

AU Invention disclosure, Functional MRI in conscious dogs, Deshpande G, Vodyanoy V, Waggoner  
P, Jia H, Pustovyy O, Beyers R, Denny T, Morrison EE 2014

US Patent Application No. 20140017338, Compositions for the methods of controlling olfactory  
responses to odorants. Vodyanoy V, Viswaprakash N, Ludmilla G, Morrison EE 2014

(i) Auburn University invention disclosures AU#2005-027 "Compositions and Methods for  
Enhancing the Olfactory Response to Odorants", AU#2016-023 "Stabilisation of Metal Nanoparticles  
for Biomedical Applications", and AU#2016-037 "Engineered Metal Nanoparticles in the Sub-  
nanomolar Levels Kill Cancer Cells"; and

(ii) U.S. Patents 8,273,381, 8,778,409 and 9,132,086 and U.S. Patent application 15/927,616;  
LICENSE AGREEMENT between AUBURN UNIVERSITY and PHYTO TECH CORP. (D/B/A BLUE  
CALIFORNIA)

Morrison EE, PI, Neuroscience laboratory has been supported by grants from NIH, DHS, FAA, ONR,  
NIST, Alzheimer's Association and intramural funds. Total funding for olfactory research over 7  
million. Morrison's laboratory has been investigating olfactory neuron development, neurogenesis,  
plasticity and neurophysiology function for over 30 years. He has published eight book chapters and  
lay articles, over 60 peer review articles and over 70 abstract presentations. His research images  
have been selected as cover photos eight times and republished by request from peer scientists over  
thirty articles and books. He has presented his work at national, international conferences helping to  
establish AU as the center for excellence nationally and internationally for canine detection. His work  
has been highlighted by BBC and National Geographic television presentations.