

BIOGRAPHICAL SKETCH

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NAME Daniel Scott Zahm	POSITION TITLE Professor		
eRA COMMONS USER NAME zahmds			
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
Bloomsburg University, Bloomsburg, PA	B.S.	1977	Biology
Pennsylvania State University, Hershey Medical Center, Hershey, PA	Ph.D.	1982	Anatomy
University of Virginia, Charlottesville, VA	Postdoctoral	1982-1985	Neuroscience

A. Personal Statement

The Zahm laboratory seeks to reveal patterns of basal forebrain neuroanatomical organization and conceptualize them in a systems context, evaluate whether and how forebrain systems so conceived may contribute to behavioral synthesis and determine what are the vulnerabilities of different forebrain systems in circumstances leading to neurodegeneration. A second focus of our work involves the neuroanatomical and functional organization of brain systems expressing the neuropeptide, neurotensin, with specific regard to its roles in the synthesis of adaptive behavior and decision-making. We have produced some frequently cited papers that have revealed critical aspects of basal forebrain anatomical and functional organization and the modulatory roles of neurotensin.

B. Positions and Honors

1982-1985	Research Associate, Departments of Neurology, Neurosurgery & Otolaryngology, University of Virginia School of Medicine, Charlottesville, VA.
1985–2004	Assistant Professor (1985-89), Associate Professor (1989-96), Professor (1996-2004), Dept. Anatomy and Neurobiology, Saint Louis University School of Medicine, St. Louis, MO.
2004-present	Professor, Department of Pharmacological and Physiological Science, Saint Louis University School of Medicine, St. Louis, MO.
1982-1985	National Research Service Fellow (USPHS-NIH NINCDS NS-07199)
1995-present	Editorial Board appointments, <i>Neuroscience</i> (1995-present), <i>Journal of Comparative Neurology</i> (2003-2007; 2011-2016), <i>Journal of Chemical Neuroanatomy</i> (2005-present).
1993, 1995	Ad hoc Member, NIDA study section DABR-3.
1997	Forbairt Fellowship, Trinity College, Dublin, Ireland.
1998-present	Frequent <i>ad hoc</i> Member, NIH-CSR study section IFCN-1(Integrative, Functional and Cognitive Neuroscience, later NMB – Neurobiology of Motivated Behavior)
1999-2000	Leverhulme Fellowship, University of St. Andrews, St. Andrews, U.K.
1999-2002	Member, NIH-CSR study section IFCN-1.
2007-2008	Field Editor for "Limbic System", <u>The Encyclopedia of Neuroscience</u> , Springer, Heidelberg, Germany, 2008.

C. Representative Publications (of 109):

1. Zahm DS, Parsley KP, Schwartz ZM, Cheng AY (2012) On lateral septum-like characteristics of outputs from the accumbal hedonic 'hotspot' of Pecina and Berridge with commentary on the transitional nature of basal forebrain 'boundaries'. *J Comp Neurol.* May 24. doi: 10.1002/cne.23157. [Epub ahead of print] PMID: 22628122; PMCID in process.
2. Zahm DS, Cheng AY, Lee TJ, Ghobadi CW, Schwartz ZM, Geisler S, Parsely KP, Gruber C, Veh RW (2011) Inputs to the midbrain dopaminergic complex in the rat with emphasis on extended amygdala-recipient sectors. *J. Comp. Neurol.* 519:3159-3188. PMID: 21618227; PMCID:

PMC3174784.

3. Lavezzi HN, Parsley KP, Zahm DS (2011) Mesopontine rostromedial tegmental nucleus neurons projecting to the dorsal raphe and pedunculopontine tegmental nucleus: psychostimulant-elicited Fos expression and collateralization. *Brain Struct Funct.* 217:719-734, 2012. [Epub ahead of print Dec 18]; PMID: 22179106; PMCID in process.
4. Lavezzi HN, Zahm DS (2011) The mesopontine rostromedial tegmental nucleus: an integrative modulator of the reward system. *Basal Ganglia* 1:191-200. PMID: 22163100; PMCID in process.
5. Zahm DS (2010) Pharmacological approach to the treatment of addiction: persisting challenges. *Missouri Med*, 107:276-280. PMID: 20806841; PMCID: PMC2964348
6. Zahm DS, Becker ML, Freiman AJ, Strauch S, DeGarmo B, Geisler S, Meredith GE, Marinelli M (2010) Fos after single and repeated self-administration of cocaine and saline in the rat: emphasis on the basal forebrain and recalibration of expression. *Neuropsychopharmacol* 35:445-463, 2010. PMID: 19794406; PMCID: PMC2795057
7. Zhou TC, Geisler S, Marinelli M, DeGarmo BA, and Zahm DS (2009) The mesopontine rostromedial tegmental nucleus: A structure targeted by the lateral habenula that projects to the ventral tegmental area of Tsai and substantia nigra compacta. *J Comp Neurol*, 513:566-596. PMID: 19235216; PMCID: PMC3116663
8. Zahm DS, and Trimble MR (2008) The dopaminergic projection system, basal forebrain macrosystems, and conditioned stimuli. *CNS Spectrums* 13:32-40. PMID: 18204412; PMCID: PMC3209755
9. Geisler S, Marinelli M, DeGarmo B, Becker ML, Freiman AJ, Beales M, Meredith GE, and D.S. Zahm (2008) Prominent activation of brainstem and pallidal afferents of the ventral tegmental area by cocaine. *Neuropsychopharmacol* 33:2688-2700. PMID: 18094667; PMCID: PMC2978288.
10. Geisler S, Derst C, Veh RW, and DS Zahm (2007) Glutamatergic afferents of the ventral tegmental area in the rat. *J Neurosci* 27:5730-5743. PMID: 17522317; PMCID: PMC3202987.
11. Reynolds SM, Bérrod A, Geisler S, and Zahm DS (2006) Modulation of a dopamine-mediated behavior by a neurotensin-containing pathway from the rostral basal forebrain to the ventral tegmental area. *Eur J Neurosci* 24:188-196. Free PMC article - PMID: 16882016
12. Loopuijt LD and Zahm DS (2006) Synaptologic and fine structural features distinguishing a subset of basal forebrain cholinergic neurons embedded in the dense intrinsic fiber network of the caudal extended amygdala *J Comp Neurol* 498:93-111. Free PMC article - PMID: 16933208
13. Reynolds SM, and Zahm DS (2005) Macrosystem-specificity of projections from prefrontal and insular cortex to ventral striatopallidum and extended amygdala. *J Neurosci* 25:11757-11767.
14. Zahm DS. (2006) The evolving theory of basal forebrain "functional-anatomical macrosystems". *Neurosci Biobehav Rev* 30:148-172.
15. Geisler S, Zahm DS. (2005) Afferents of the ventral tegmental area in the rat - anatomical substratum for integrative function. *J Comp Neurol* 490:270-294.

D. Research Projects Ongoing or Completed During the Last 3 Years:

On-going:

R01 NIH NS023805 D.S. Zahm (PI) 12/01/2007 - 12/31/2012

NIH/NINDS

Convergent vs. Parallel Striatal Dopaminergic Afferents

Because the mesocorticolimbic system is essential to the detection of novelty, primary rewards, reward-predicting stimuli and the enlistment of appropriate adaptive behavioral responses, and because the septal-preoptic system projects robustly to the neurons of origin of the mesocorticolimbic system in the VTA, it seems likely that the actions of the septal-preoptic system, mediated at least in part by neurotensin acting in the VTA, are involved in mechanisms brought to bear to weigh threat and gain in the consideration of potential actions. In view of these considerations, the following specific aims were stated: 1. Establish neuroanatomical relationships of the lateral septum and lateral preoptic-rostral lateral hypothalamic region (LPH); 2. Investigate behavioral correlates of activating and inactivating the lateral septum and LPH; 3. Determine if activation of LPH produces internalization of NTS1 (neurotensin) receptors within dopaminergic neurons in the VTA. Maladaptive decision-making in humans coexists with anxiety, depression, fear, panic and obsession-compulsion. At a subclinical, social level, bad decisions pervade chronic joblessness, dysfunctional interpersonal relationships, ruinous child-rearing and addictions. Indeed, addiction is bad decision-making by

definition, i.e., behavior compulsively repeated in the certain knowledge of its self-destructiveness. This research will address the structural and functional organization of an important, but poorly understood, component of the brain systems that subserve decision-making.