BIOGRAPHICAL SKETCH

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NAME	POSITION TITLE
Grueter, Brad A.	Assistant Professor
eRA COMMONS USER NAME (credential, e.g., agency login) grueter.brad	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Illinois College, Jacksonville IL	B.S.	5/1998	Biology
University of Illinois, Springfield IL	M.S.	5/2001	Biology
Vanderbilt University School of Medicine, Nashville TN	Ph.D.	8/2001-5/2006	Neuroscience
Vanderbilt University School of Medicine, Nashville TN	Post doc	5/2006-10/2006	Neuroscience
Stanford University, Palo Alto CA	Post doc	10/2006-9/2012	Neuroscience

A. Personal Statement.

The Grueter lab research program centers on investigating mechanisms underlying motivational learning and the details of how these mechanisms are modified by experience and pathophysiological disease states. The nucleus accumbens (NAc), as part of the mesolimbic dopamine system, integrates a complex mix of excitatory, inhibitory and modulatory inputs to optimize adaptive motivated behaviors. Our efforts are focused on advancing the current understanding of the NAc circuitry and its involvement in adaptive responses to experience. We investigate the developmental and adaptive modifications of NAc synaptic connectivity and function, incorporating mouse models of reward learning. These models are a powerful tool to study how brain circuits function in a coordinated manner to manifest a behavior. Moreover, the inducible and temporal nature of this model system offers insight into various other neuropsychiatric diseases. Thus, we are working toward dissecting these complex behaviors underlying pathophysiological states into elemental biological entities. These biological entities represent synapses in specific NAc neurocircuits. By understanding the synaptic modifications brought about by *in vivo* experience, we can begin to parse out molecular and therapeutic targets and approaches for preventing or treating neuropsychiatric disorders. Specifically, we utilize a combination of cutting edge techniques in electrophysiology, molecular biology, optogenetics and behavior to elucidate the molecular synaptic constituents in the NAc that are necessary and sufficient to drive complex motivated behaviors. We utilize a multitude of transgenic mouse lines such as the conditional NMDAR subunit knockout mice to gain a cell-type and circuit specific resolution of synaptic function at the behavioral, circuit, synaptic, post-translational and transcriptional levels. Ultimately, these approaches allow us to determine the functional implications of specific proteins on NAc circuits that underlie motivated behaviors and the consequences of in vivo experience on these behaviors.

B. Positions and Honors

Positions and Employment

5/1999-8/2001 Research technician. AE Staley Manufacturing Company.
5/2006-10/2006 Postdoctoral Fellow. Molecular Physiology and Biophysics, Vanderbilt University School of Medicine.
11/2006-9/2012 Postdoctoral Fellow. Psychiatry & Behavioral Sciences, Stanford University.
10/2012-present Assistant Professor. Department of Anesthesiology, Vanderbilt University School of Medicine

Other Experience and Professional Memberships

2003-present Society for Neuroscience
2012-present The Tennessee Physiological Society

Honors and Awards

2007 Frontiers in Addiction Travel Award
2007-2010 National Research Service Award, Postdoctoral Fellowship Award

C. Selected peer-reviewed publications (in chronological order)

Weitlauf, C., Egli, R. E., **Grueter, B. A**., and Winder, D. G. (2004). High-frequency stimulation induces ethanol-sensitive long-term potentiation at glutamatergic synapses in the dorsolateral bed nucleus of the stria terminalis. **Journal of Neuroscience** *24*, 5741-5747. PMID:15215296

Grueter, B. A., and Winder, D. G. (2005). Group II and III metabotropic glutamate receptors suppress excitatory synaptic transmission in the dorsolateral bed nucleus of the striat terminalis. **Neuropsychopharmacology** *30*, 1302-1311. PMID:15812571

Grueter, B. A., Gosnell, H. B., Olsen, C. M., Schramm-Sapyta, N. L., Nekrasova, T., Landreth, G. E. and Winder, D. G. (2006). Extracellular-signal regulated kinase 1-dependent metabotropic glutamate receptor 5-induced long-term depression in the bed nucleus of the stria terminalis is disrupted by cocaine administration. **Journal of Neuroscience** *26*:3210-3219. PMID:16554472

Grueter, B. A., McElligott, Z. A. and Winder, D. G. (2007). Group I mGluRs and long-term depression: potential roles in addiction? **Molecular Neurobiology** 36(3): 232-44. PMID:17955198

Grueter, B. A. and Winder, D. G. mGluR functions. *Encyclopedia of Neuroscience*, 3rd Edition.

Grueter, B. A., Z. A. McElligott, A. J. Robison, G. C. Matthews and D. G. Winder (2008). In vivo metabotropic glutamate receptor 5 (mGluR5) antagonism prevents cocaine-induced disruption of postsynaptically maintained mGluR5-dependent long-term depression. **Journal of Neuroscience** *28*(37):9261-9270. PMID:16554472

Daadi MM, Li Z, Arac A, **Grueter BA**, Sofilos M, Malenka RC, Wu JC, Steinberg GK. (2009). Molecular and magnetic resonance imaging of human embryonic stem cell-derived neural stem cell grafts in ischemic rat brain. **Molecular Therapy**. Jul;17(7):1282-91. PMID:19436269

Daadi MM, Lee SH, Arac A, **Grueter BA**, Bhatnagar R, Maag AL, Schaar B, Malenka RC, Palmer TD, Steinberg GK. (2009). Functional engraftment of the medial ganglionic eminence cells in experimental stroke model. **Cell Transplant**. 18(7):815-26. PMID:19500468

McElligott ZA, Klug JR, Nobis WP, Patel S, **Grueter BA**, Kash TL and Winder DG. 2010. Distinct forms of Gq-receptor-dependent plasticity of excitatory transmission in the BNST are differentially affected by stress. **Proc Natl Acad Sci U S A**. Feb 2; 107(5):2271-6. PMID:20133871

Grueter, B.A., Brasnjo, G. and Malenka, R.C. Postsynaptic TRPV1 triggers cell-type specific LTD in the nucleus accumbens. **Nature Neuroscience***.* 2010 Dec; 13(12): 1519-25. PMID:21076424

Gosnell, H.B., Silberman, Y., **Grueter, B.A.**, Duvoisin, R.M., Raber, J. and Winder, D.G. mGluR8 modulates excitatory transmission in the bed nucleus of the stria terminalis in a stress-dependent manner. **Neuropsychopharmacology**. 2011 Jul;36(8):1599-607

Grueter, B.A., Rothwell, P.E. and Malenka, R.C. Integrating synaptic plasticity and striatal circuit function in addiction. **Current Opinion in Neurobiology**. 2011 Oct. PMID: 22000687.

Nelson, A., Hang, G., **Grueter, B**., Pascoli, V., Luscher, C., Malenka, R., and Kreitzer, A. A comparison of striatal-dependent behaviors in wild-type and hemizygous Drd1a and Drd2 BAC transgenic mice. **J Neurosci**. 2012 Jul 4;32(27):9119-9123. PMID: 22764221

Lim, B.K., Huang, K.W., **Grueter, B.A.**, Rothwell, P.E., Malenka, R.C. (2012) Anhedonia requires MC4R-mediated synaptic adaptation in nucleus accumbens. **Nature***.* 2012 Jul 11;487(7406):183-9. PMID: 22785313.

Daadi, M.M., **Grueter, B.A.**, Malenka, R., Redmond Jr., D.E., Steinberg, G.K. Dopaminergic neurons from midbrain-specific human embryonic stem cell-derived neural stem cells engrafted in non-human primate model of Parkinson's disease. **PLoS One**. 2012;7(7):e41120. Epub 2012 Jul 17. PMID: 22815935

Grueter, B.A., Robison, A.J., Neve, R.L., Nestler, E.J. and Malenka, R.C. (2013). ΔFosB differentially modulates nucleus accumbens direct and indirect pathway function. **Proc. Natl. Acad. Sci. U.S.** *doi:10.1073/pnas.1221742110.*

Xu, P., **Grueter, B. A.**, Britt, J. K., McDaniel, L., Huntington, P. J., Hodge, R., Tran, S., Mason, B. L., Lee, C., Vong, L., Lowell, B. B., Malenka, R. C., Lutter, M., Pieper, A. A. (2013). Double deletion of melanocortin 4 receptors and SAPAP3 corrects compulsive behavior and obesity in mice. **Proc. Natl. Acad. Sci. U.S.** *doi:10.1073/pnas.1308195110.*

D. Research Support

Ongoing Research Support

Title: Synaptic Mechanisms of Addiction-Related Behaviors in the Nucleus Accumbens *P.I.* Brad A. Grueter
Agency: NIDA
Type: K99/R00 (DA031699, year 2; period 08/15/11 – 7/31/13)
Description: This project is meant to elucidate the synaptic modifications from three major excitatory inputs onto two populations of nucleus accumbens medium spiny neurons in response to *in vivo* cocaine experience.

Completed Research Support

Project Title: Role of PSD-95 in Synaptic and Drug Induced Plasticity in Dopamine Neurons. *PI* Brad A. Grueter, *Agency*: NIDA
Type: F32 (DA023741)
Description: The major goal of this project is to examine the role of PSD-95 in synaptic function at excitatory synapses onto Dopaminergic neurons in the VTA in a normal and a cocaine-induced pathophysiological state.