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Degrees and Education:

Lamar University, Beaumont, TX	BS	05/73	Biology
Lamar University, Beaumont, TX	MS	08/75	Biology
University of Texas Med Br. Galveston, TX	Ph.D.	12/80	Pharmacology/Neurosci.
School of Pharmacy, University of London	postdoctoral	12/80-10-82	Pharmacology/Neurosci
Baylor College of Medicine, Houston, TX	postdoctoral	11/82-12/83	Neuroscience

Research Synopsis

Over the past several years our lab has described age-related changes in ligand-gated channels, voltage-gated calcium channels and calcium homeostasis in basal forebrain neurons across aging and behavioral state. Our long-term goal is to identify the cellular and molecular mechanisms responsible for these age-related changes. We utilize a rodent model of aging coupled with a variety of techniques including, patch-clamp electrophysiology, measurements of intracellular calcium concentration ($[Ca^{2+}]_i$), laser scanning confocal fluorescent microscopy, single-cell reverse transcription/polymerase chain reaction (scRT-PCR) and behavioral characterization using the water maze. Our results support a model in which compensatory physiological modifications attempt to offset age-related changes in basal forebrain neurons.

Most recently, our research program uses a rat model of ovarian aging and menopause to test the non-genomic estrogenic mechanisms that control calcium signaling and synaptic function against a background of long-term estrogen therapy and cognitive status. The long-term goals are to identify the cellular and molecular mechanisms responsible for age- and hormonal-related changes in cellular function.

Selected recent publications:

Jasek, M.C. and **Griffith, W.H**. Characterization of excitatory amino acid responses on young and aged F344 rat MS/nDB neurons. Neuroscience 82:1179-1194, 1998.

Murchison, D. and **Griffith, W.H**. Increased calcium buffering in basal forebrain neurons during aging. J. Neurophysiol. 80:350-364, 1998.

Dove, L.S., Abbott, L.C. and **Griffith, W.H**. Whole-cell and single channel analysis of P-type calcium currents in cerebellar Purkinje cells of leaner mutant mice J. Neuroscience 18: 7687-7699, 1998.

Murchison, D. and **Griffith, W.H.** Age-related alterations in caffeine-sensitive calcium stores and mitochondrial buffering in rat basal forebrain. Cell Calcium 25: 439-452,1999.

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Dove, L.S., Nahm, S-S., Murchison, D., Abbott, L.C. and **Griffith, W.H.** Altered calcium homeostasis in cerebellar purkinje cells of leaner mutant mice. J. Neurophysiol. 84: 513-524, 2000.

Han, S-H., McCool, B.A., Murchison,D., Nahm, S-S.,Parrish, A.R. and **Griffith, W.H**. Single-cell RT-PCR detects shifts in the mRNA expression profiles of basal forebrain neurons during aging. Mol. Brain Research 98:67-80, 2002.

Griffith, W.H. Commentary: quest for ion channel modulation by free radicals during brain aging. Neurobiology of Aging 23: 835-836, 2002.

Jung K-Y., Dean D., Jiang J., Gaylor S., **Griffith**, **W.H.**, Burghardt RC. And Parrish A.R. Loss of N-cadherin and α- catenin in the proximal tubules of aging male Fischer 344 RATS. Mechanisms of Ageing and Development, 125: 445-453, 2004.

Murchison, D., Zawieja, D.C. and **Griffith, W.H**. Changes in mitochondrial function affect calcium homeostasis in aged rat basal forebrain. Cell Calcium, 36: 61-75, 2004.

Nahm S-S., Jung K-Y., Enger M.K., **Griffith, W.H.** and Abbott L.C. Differential expression of T-type calcium channels in P/Q-type calcium channel mutant mice with ataxia and absence epilepsy. Journal of Neurobiolgy, 62: 352-360, 2005.

Nahm, S-S., Farnell Y.Z., **Griffith, W.H.** and Earnest, D.J. Circadian Regulation and Function of Voltage-Dependent Calcium Channels in the Suprachiasmatic Nucleus. Journal of Neuroscience, 25: 9304-9308, 2005.

Griffith W.H., Han, S-H., McCool B.A., Murchison, D. Molecules and membrane activity: single-cell RT-PCR and patch-clamp recording from central neurons. In: Neuroanatomical Tract Tracing 3: Molecules-neurons-Systems, Eds., L. Zaborszky, F. Wouterlood and J.L. Lanciego, pp 142-174, 2006

Etheredge JA, Murchison D, Abbott LC, **Griffith W.H**. Functional compensation by other voltage gated Ca^{2+} channels in mouse basal forebrain neurons with $Ca_v2.1$ mutations Brain Research, 1140: 105-119, 2007.

LaSarge CL, Montgomery KS, Tucker C, Slaton S, **Griffith WH**, Setlow B, Jennifer L. Bizon. Deficits across multiple cognitive domains in a subset of aged Fischer 344 rats. Neurobiology of Aging, 28:928-936, 2007.

Huang L.Z., Liu X., **Griffith W.H.**, Winzer-Serhan U.H. Chronic neonatal nicotine increases anxiety but does not impair cognition in adult rats. <u>Behavioral Neuroscience</u> 121(6), 1342-1352, 2007.

Bizon, JL, LaSarge, CL, Montgomery, KS, McDermott, AN, Setlow, B, **Griffith, WH** . Spatial reference and working memory across the lifespan of male Fischer 344 rats. <u>Neuroboiology of Aging</u>, 30 (4), 646-655, 2009.

Murchison, D, McDermott,AN, Bizon JL, Peebles, KA, **Griffith, WH**. Enhanced Calcium Buffering in F344 Rat Cholinergic Basal Forebrain Neurons is Associated with Age-related Cognitive Impairment. Journal of Neurophysiology102:2194-2207, 2009.

Damborsky, J, **Griffith, WH**, Winzer-Serhan, UH. Chronic neonatal nicotine exposure increases excitation in the young adult rat hippocampus in a sex-dependent manner. Brain Research.1430: 8-17, 2012.