

GORDON F. BUCHANAN

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RESIDENCY TRAINING

Neurology Resident Neurology Department, Yale University/Yale-New Haven Hospital, *July 2005 – June 2008*

Medical Intern Primary Care Program, Yale University, *June 2004 - June 2005*

EDUCATION

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN (UIUC)

M. D. College of Medicine/Medical Scholars Program, *August 1995 - May 2004*

Ph. D. Molecular and Integrative Physiology, *August 1995 - May 2003*

Thesis Advisor: Dr. Martha U. Gillette

Thesis Title: Cholinergic regulation of the mammalian circadian system: Phase shifts *in vivo* and *in vitro* in wild-type and M₁ knockout mice induced by cholinergic agonists

M. S. Molecular and Integrative Physiology, *August 1995-May 1997*

B. S. General Biology with Distinction (Chemistry Minor), *August 1991 - May 1995*

PROFESSIONAL EXPERIENCE

Research

Postdoctoral Associate

Respiratory Laboratory of Dr. George B. Richerson, Yale University, *2006-present*

Graduate Student/Research Assistant

Circadian Biology Laboratory of Dr. Martha U. Gillette, UIUC, *1996-2004*

Undergraduate Research Student

Auditory Research Laboratory of Dr. Albert S. Feng, UIUC, *1994-1995*

Neural Development Laboratory of Dr. Janice M. Juraska, UIUC, *1994*

Circadian Biology Laboratory of Dr. Evelyn Satinoff, UIUC, *1993-1994*

Laboratory Technician

Mycology Laboratory of Dr. Carol A. Shearer, UIUC, *1993-1995*

Teaching

Neuroanatomy Instructor, School of Medicine, Yale University, *2006-present*

Biology Teaching Assistant, School of Life Sciences, UIUC, *1995-1996*

CPR Instructor, Illini Emergency Medical Services, UIUC, *1994-1996*

GRANTS & AWARDS

Fellowship in Sleep Medicine, Jazz Pharmaceuticals, *2008-2009*

Veteran's Affairs Special Fellowship in Neuroscience, West Haven Veteran's Affairs Medical Center, 2008-2010

Bannister Award, Neurology Dept, Yale University, 2007

Meeting Fellow, Consortium of Multiple Sclerosis Centers Annual Meeting, Washington, DC, 2007

Outstanding Contribution to the Dept of Molecular and Integrative Physiology, UIUC, 2003

NIH Individual M.D./Ph.D. Predoctoral NRSA, NIMH, 2001-2004

Meeting Fellow/Selected Speaker, Ninth Symposium on Subtypes of Muscarinic Receptors, Houston, TX, 2000

Graduate College Travel Award, UIUC, 2000

NIH Sponsored Systems and Integrative Biology Training Program Fellow, UIUC, 1998-2000

Walter Rice Craig Summer Research Fellowship, College of Medicine, UIUC, 1998

Graduate Student Meeting Award, FASEB Meeting on Chronobiology, Snowmass, CO, 1998

Student-Ranked Outstanding Teaching Assistant, UIUC, 1995, 1996

PROFESSIONAL AFFILIATIONS

Society for Neuroscience, 2000-present

American Academy of Neurology, 2005-present

PUBLICATIONS

Buchanan, GF, MR Hodges, and GB Richerson. 2008. Contribution of chemosensitive serotonergic neurons to interactions between the sleep-wake cycle and respiratory control. In Serotonin and sleep: Molecular, functional and clinical aspects (Monti JM, Pandi-Perumal SR, Jacobs BL and Nutt DJ Eds.), Birkhauser Verlag, Basel, Switzerland. 529-554.

Buchanan, GF and MU Gillette. 2005. New light on an old paradox: Site-dependent effects of carbachol on circadian rhythms. *Exp. Neurol.* 193: 489-496.

Tischkau, SA, JW Mitchell, S-H Tyan, **GF Buchanan**, and MU Gillette. 2003. Ca²⁺/cAMP response element binding protein (CREB)-dependent activation of *Per1* is required for light-induced signaling in the suprachiasmatic nucleus circadian clock. *J. Biol. Chem.* 278(2): 718-723.

Gillette, MU, **GF Buchanan**, LR Artinian, SE Hamilton, NM Nathanson, C Liu. 2001. Role of the M₁ receptor in mediating circadian rhythms. *Life Sci.* 68(22-23): 2467-2472.

Tischkau, SA, EA Gallman, **GF Buchanan**, and MU Gillette. 2000. Differential cAMP gating of glutamatergic signaling regulates long-term state changes in the suprachiasmatic circadian clock. *J. Neurosci.* 20(20): 7830-7837.

Chen, D, **GF Buchanan**, JM Ding, J Hannibal, and MU Gillette. 1999. Pituitary adenylyl cyclase-activating peptide: a pivotal modulator of glutamatergic regulation of the suprachiasmatic

circadian clock. *Proc. Natl. Acad. Sci. USA*. 96(23): 13468-13473.

Ding, JM, **GF Buchanan**, SA Tischkau, D Chen, L Kuriashkina, LE Faiman, JM Alster, PS McPherson, KP Campbell, and MU Gillette. 1998. A neuronal ryanodine receptor mediates light-induced phase delays of the circadian clock. *Nature*. 394(6691):381-384.

ABSTRACTS

Buchanan, GF, MR Hodges, and GB Richerson. 2007. Deficiency in hypercapnia-induced arousal in mice with genetic deletion of serotonergic neurons. *Soc. Neurosci. Abstr.* 33: 736.12.

Mitchell, JW, SA Tischkau, S-H Tyan, **GF Buchanan**, WJ Hurst, and MU Gillette. 2002. Light/Glutamate-induced resetting of the SCN clock requires activation of a CRE-mediated pathway. *Soc. Neurosci. Abstr.* 28(1).

Abbott, SM, **GF Buchanan**, Q Chang, PE Gold, and MU Gillette. 2002. Deciphering the role of the cholinergic input to the mammalian circadian clock. *Soc. Res. Biol. Rhythm. Abstr.* 8.

Buchanan, GF and MU Gillette. 2001. Carbachol directly stimulating the SCN induces phase advances of mouse circadian rhythms *in vitro* and *in vivo*. *Soc. Neurosci. Abstr.* 27(1): 182.20.

Tyan, SH, LE Faiman, SM Abbott, **GF Buchanan**, W Yu, E Gratton, and MU Gillette. 2001. Calpain, a calcium-activated protease, mediates light/glutamate-induced phase delays in the SCN clock. *Soc. Neurosci. Abstr.* 27(1): 182.18.

Buchanan, GF, LR Artinian, SE Hamilton, NM Nathanson, and MU Gillette. 2001. The M₁ muscarinic acetylcholine receptor is a necessary component in cholinergic circadian signaling. *Life Sci.* 68(22-23): 2629.

Buchanan, GF, LR Artinian, SE Hamilton, NM Nathanson, and MU Gillette. 2000. The M₁ muscarinic acetylcholine receptor is a necessary component in cholinergic circadian signaling. *Soc. Neurosci. Abstr.* 26(2): 2256.

Tischkau, SA, EA Gallman, **GF Buchanan**, and MU Gillette. 2000. Activation of protein kinase A: a cellular mechanism for nocturnal glutamate-PACAP interactions in the SCN. *Soc. Res. Biol. Rhythm. Abstr.* 7.

Gillette, MU, D Chen, **G Buchanan**, J Ding, J Hannibal, and SA Tischkau. 2000. A code for light: Nocturnal glutamate-PACAP interactions regulate shift amplitude of the suprachiasmatic circadian clock. *Soc. Res. Biol. Rhythm. Abstr.* 7.

Chen, D, **GF Buchanan**, JM Ding, J Hannibal, and MU Gillette. 1999. PACAP: a pivotal modulator of glutamatergic regulation of the suprachiasmatic circadian clock. *Soc. Neurosci. Abstr.* 25(2):1889.

Kuriashkina, LR, JM Ding, **GF Buchanan**, and MU Gillette. 1998. Carbachol-induced phase advance in the rat SCN is mediated via intracellular Ca²⁺ and nitric oxide. *Soc. Neurosci. Abstr.* 24(1): 1184.

Ding, JM, **GF Buchanan**, SA Tischkau, LE Faiman, JM Alster, D Chen, L Kuriashkina, PS McPherson, KP Campbell, and MU Gillette. 1998. A neuronal ryanodine receptor mediates light-induced phase delays of the circadian clock. *Soc. Res. Biol. Rhythm. Abstr.* 6:20.

Kuriashkina, LR, **GF Buchanan**, JM Ding, SA Tischkau, JA Barnes, and MU Gillette. 1997.

Expression of m1 cholinergic receptors in the rat suprachiasmatic nucleus. *Soc. Neurosci. Abstr.* 23(1):510.

Ding, JM, **GF Buchanan**, SA Tischkau, and MU Gillette. 1997. Ryanodine receptors mediate glutamate-induced phase delays of circadian rhythms in rat. *Soc. Neurosci. Abstr.* 23(1):242.

ORAL PRESENTATIONS

Buchanan, GF. 2008. The Ascending Arousal System: Overview and clinical implications. *Department of Neurology Grand Rounds.* Yale University. New Haven, CT.

Buchanan, GF. 2002. Examination of cholinergic phase shifting *in vivo* and *in vitro* in B6129PF1/J mice. *UIUC Medical Scholars Program Annual Meeting.* Allerton Conference Center, Monticello, IL.

Buchanan, GF, LR Artinian, SE Hamilton, NM Nathanson, and MU Gillette. 2001. The M₁ muscarinic acetylcholine receptor is a necessary component in cholinergic circadian signaling. *Department of Molecular and Integrative Physiology Annual Meeting.* UIUC.

Buchanan, GF, LR Artinian, SE Hamilton, NM Nathanson, and MU Gillette. 2000. The M₁ muscarinic acetylcholine receptor is a necessary component in cholinergic circadian signaling. *Ninth Symposium on Subtypes of Muscarinic Receptors.* Oct. 31-Nov. 4, Houston, TX.

Buchanan, GF. 2000. The M₁ muscarinic acetylcholine receptor is a necessary component in cholinergic circadian signaling. *Systems and Integrative Biology Training Program Seminar.* UIUC.

Buchanan, GF. 1999. Cholinergic influence on circadian function. *Systems and Integrative Biology Training Program Seminar.* UIUC.