

CURRICULUM VITAE, APPLICANT: CHRISTOPH LOSSIN, PH.D.

Education

1996	"Vordiplom" (B.S.), Universität Hohenheim, Germany
1999	M.S. (Biological Sciences), University of Delaware, Newark
2003	Ph.D. (Neuroscience), Vanderbilt University, Nashville
2003	Postdoctoral Fellow, Vanderbilt University, Nashville
2004 – 2007	Postdoctoral Fellow, Osaka University, Japan
2007 – now	Assistant Researcher, University of California, Davis

Previous appointments

1995 – 1996	Research Assistant, Zoology/Parasitology Department, Universität Hohenheim
1997 – 1999	Teaching Assistant, Biology Department, University of Delaware
1999 – 2003	Research Assistant, Pharmacology Department, Vanderbilt University
2003	Postdoctoral Fellow, Pharmacology Department, Vanderbilt University
2004 – 2007	Postdoctoral Fellow, Pharmacology Department, Osaka University

Society and Activities

2001	The Society for Neuroscience
2004	The Japanese Pharmacological Society
2004	The Physiological Society of Japan
2005	The American Physiological Society

Specialization

molecular biology
electrophysiology
pharmacology

Awards

1996	Travel Grant, German/American Fulbright Commission
1996	Full College Scholarship, GAWC – Federation of German-American Clubs
2001	Pre-Doctoral Research Fellowship, Epilepsy Foundation
2004 – 2005	Chihiro & Kiyoko Yokochi Fund Fellowship, Kanehara Foundation
2006 – 2007	Long-term Fellowship For Foreign Researchers, Japan Society for the Promotion of Science
2006 – 2007	Graham Goddard Junior Investigator Award, CURE – Citizens United for Research in Epilepsy (declined due to funding conflicts)

Publications

Ohno, Y., Hibino H., **Lossin, C.**, Inanobe, A., and Y. Kurachi, Preferential Block of astroglial Kir4.1 channels by selective serotonin reuptake inhibitors, *Brain Res.* (in press).

Suwen, S., Ohno, Y., **Lossin, C.**, Inanobe, A., Hibino, and Y. Kurachi (2007). Inhibition of astroglial inwardly rectifying Kir4.1 channels by a tricyclic antidepressant, nortriptyline. *J. Pharmacol. Exp. Ther.* 320: 573-580.

Lossin, C., Hibino, H., Ishii, A., Hirose, S. and Y. Kurachi. Quinidine blocks the inwardly-rectifying K⁺ channel Kir4.1 (in preparation).

Lossin, C. and A.L. George, Jr., Functional diversification through splicing variability in the neuronal voltage-gated sodium channel SCN1A (in preparation).

Vanoye, C.G., **Lossin, C.**, Rhodes, T.H., and A.L. George, Jr. (2006). Single-channel properties of human Nav1.1 and mechanism of channel dysfunction in SCN1A-associated epilepsy. *J. Gen. Physiol.*, 127(1): 1-14.

Rhodes, T.H., **Lossin, C.**, Vanoye, C.G., Wang, D.W., and A.L. George, Jr. (2004). Non-inactivating Voltage-gated Sodium Channels in Severe Myoclonic Epilepsy of Infancy. *Proc. Natl. Acad. Sci. U S A.* 101(30): 11147-11152.

Lossin, C., Rhodes, T.H., Desai, R.D., Vanoye, C.G., Wang, D.W., Carniciu, S., Devinsky, O., and A.L. George, Jr. (2003). Epilepsy-associated Dysfunction in the Voltage-gated Neuronal Sodium Channel, SCN1A. *J. Neurosci.* 23(36): 11289-95.

Lossin, C., Rhodes, T.H., Vanoye, C.G., Wang, D.W., and A.L. George, Jr. (2002). Molecular basis of an inherited epilepsy. *Neuron* 34: 877-884.

Patents

Alfred L. George & **Christoph Lossin**: Expression system for human brain-specific voltage-gated sodium channel, type 1, US patent # 20050260576

DESCRIPTION OF THE PROPOSED PROJECT

Title: *“Brain Slice Electrophysiology With Mouse Epilepsy Models”*
Period: 10 – 20 February 2008 (10 days; starting date, but not duration, may change)
Amount Requested: \$2,700

The proposed activity is one-on-one technical training in the preparation of and electrophysiological recording from mouse brain slices in a host laboratory that has extensive experience in brain slice electrophysiology. The training will include the following topics:

- solutions & reagents
- anesthesia
- surgery (brain removal)
- preparation of brain tissue slices
- morphological identification of neurons of interest
- standard clamping methods (voltage/current) for extra- and intracellular recording

Each topic comprises a series of steps that need to be taken to reach the final goal of a successful electrophysiological recording from a brain slice. Of special concern is the surgical removal of the brain from the body and the subsequent sectioning into slices: rapid completion of the procedure is critical to avoid damage to the internal structures of the sample as it will be separated from the circulatory system. This, and the fact that the sample must be handled with care not to mechanically compromise the structures to be examined, adds to the technical challenge of the experiment such that direct instruction by an experienced peer can substantially enhance the learning experience.

In more detail: To produce slices of the highest-possible quality, the applicant will first learn how to best administer anesthesia to the animal. This is of special concern in context of the primary interest of the applicant, as many ion channels are susceptible to blockade by common anesthetics. Proper sedation of the animal that will not interfere with the experiment is hence crucial. Next, solutions have to be made (e.g., artificial cerebrospinal fluid, cutting solution, etc.), tempered, and saturated with an oxygen/carbon dioxide mixture according to a customized protocol. This is followed by the surgical removal of the brain, which requires the opening of various skull structures in particular locations, where less-than-optimal technique can irrevocably damage the brain to be examined. Brain areas of interest (e.g., amygdale, hippocampus) are then morphologically identified and isolated as a block. Depending on the question to be answered, special care must be taken not to disturb associated neuronal circuitry.

Once removed, the brain tissue block is glue-mounted in a vibratome and sectioned into slices using an empirically optimized protocol. This part of the slice preparation is a key factor in determining the outcome of the experiment as the quality of the samples depends to a large extent on the manual skills of the experimenter. Next, the slices are acclimatized and transferred into the recording chamber, where the cells of interest are identified based on their morphology with near-infrared microscopy. Extra- or intracellular current- or voltage-clamping follows, using stimulus protocols fitting the need of the experiment. Methods for pipette positioning, application of stimuli, and obtaining different clamping configurations will be discussed and practiced as well.

All training will be overseen by Dr. Maria Braga, Ph.D. (see contact information below), whose expertise in slice electrophysiology, brain anatomy, and epilepsy is well documented by her

publications. Additional mentoring may be provided by Dr. Dmitriy Fayuk, Ph.D., at the neighboring National Institute of Health. Dr. Fayuk is an experienced biophysicist, who has been working in the field of neurophysiology using brain slices for many years.

EXPLANATION HOW THE CAREER ENHANCEMENT AWARD WILL BENEFIT THE APPLICANT'S RESEARCH

The knowledge gained by the proposed training includes detailed expertise on subtle but crucial details of sectioning, handling, and recording from freshly prepared brain slices. The challenge of the experiment is that all tissue manipulations have to be done in a speedy yet careful fashion to ensure that all main anatomical structures are left unharmed – a prerequisite for functional neuronal circuitry.

The one-on-one instruction in the proposed training cannot be replaced by a literature-based autodidactic approach. Most of the information gained is, of course, available in textbooks and in specialized protocols, but finding the such can be challenging and even if found, interpretation of the information provided can pose a problem. The ability of direct interaction with an expert who can provide instant answers to upcoming questions and helpful advice on how to proceed is the most effective learning approach. Given the familiarity of Dr. Braga with the species and the specific aim of the study, the learning period of the applicant can be significantly reduced as the time-consuming trial-and-error leading up to successful recordings is replaced by directed learning-by-doing. Such immediate mentor contact can effectively avoid methodological dead-ends.

Aside from the above-mentioned manual instructions, the applicant will gain valuable knowledge on the equipment used in brain slice electrophysiology. As with any other technique, it is also true for brain slice electrophysiology that good skills are best paired with proper tools. Selecting the equipment (e.g., recording chambers, vibratomes, brain molds, stimulators, amplifiers, etc.) can be daunting task and getting assistance in this endeavor from others that are experienced will markedly accelerate the setup of a slice electrophysiology station in the applicant's own laboratory.

Very valuable also will be the expertise of Dr. Braga in brain morphology as proper cell identification must first be provided to allow the experiment to begin. Here, too, the applicant will benefit greatly from the advice of the host, as instant feedback is possible which allows for rapid development of morphology knowledge in Dr. Lossin.

Host: Maria F. Braga, D.D.S., Ph.D.
Assistant Professor Department of Anatomy, Physiology, and Genetics
Uniformed Services University of the Health Sciences
4301 Jones Bridge Rd
Bethesda, MD 20814-4799
Phone/Fax: 301-295-3524/3566
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Web: <http://www.usuhs.mil/apg/braga.html>

JUSTIFICATION FOR REQUESTED FUNDS

The funds requested were calculated for a 10-day stay of the applicant, Christoph Lossin, Ph.D., in the laboratory of Dr. Maria Braga, Ph.D., which is part of the Department of Anatomy, Physiology, and Genetics at the Uniformed Services University of the Health Sciences (USUHS) in Bethesda, Maryland.

Note that for all items listed, discounted internet offers are assumed. All funds will be used toward the proposed training of the applicant only or toward directly associated costs such as living expenses during the stay at the host laboratory. All funding will go toward a single support period (10 days, February 2008)

Category	Item	Company	Quantity	Price	Total
travel	refundable ¹ air fare 1. SMF ² > BWI ³ 2. BWI > SMF	United Airlines	1 ticket	\$750	\$750
travel	shuttle to/from airport to/from hotel (35 miles),	The Airport Shuttle, Inc.	2 tickets	\$60	\$120
transportation	11-day metro pass or commuting ⁴ equivalent (e.g., taxi) for hotel ↔ laboratory	Washington Metropolitan Area Transit Authority	1	\$50	\$50
accommodations	economy hotel room	Travelodge	10 nights	\$100/day	\$1,000
food	breakfast/lunch/dinner	various	11 days	\$30/day	\$330
host supplies	animal costs, chemicals, disposables, reagents, etc.	various	mixed, 9 days	\$50/day	\$450
Total					\$2,700

¹ the ticket has to be bought “refundable” to avoid fees (\$200+) due to rearrangement of the starting date

² Sacramento International Airport

³ Baltimore-Washington International Airport

⁴ this is a cost-saving incentive, as hotel rooms close to the research address average \$150-\$200, whereas more distant hotels offer discounts

DESCRIPTION OF CURRENT RESEARCH PROGRAM

Ion channels control cellular excitability by selectively mediating ionic current across the cellular membrane. Any alteration in ion channel behavior can hence lead to excitability disorders. First genetic evidence for this relationship was produced in 1995, when patients suffering from nocturnal seizures were found to have mutations in a subunit of the nicotinic acetylcholine receptor – a cation channel situated at the neuronal synapse (*Nat Genet* 11:201). Within the last years, ion channels have arguably developed into the most prolific group of epilepsy culprits. New reports on ion channel mutations are published weekly and the functional effects of some of these mutations have been carefully characterized by the applicant (*Neuron* 34:877, *J Neurosci* 23:11289, *PNAS* 101:11147, *JGP* 127:1) and others in heterologous expression systems (e.g., *Xenopus* oocytes, human embryonic kidney cells, etc.). So far, however, very few data exist on the consequences of these mutations for the central nervous system as a whole. This information is essential as ion channel action and dysfunction must be examined within the natural environment to determine the net effect of the mutational changes. Primarily due to the extensive labor and financial commitment associated with generating transgenic animals, such studies are rare. Nonetheless, their information value is unsurpassed in establishing the true overall impact of a mutation on the living organism.

The applicant supports a research program that characterizes transgenic mice with induced human epilepsy mutations, particularly in neuronal ion channels. The objectives of the program are (1) to define the loci of seizure initiation and investigate the mechanisms of seizure generation in these mouse models of human epilepsy, (2) to characterize the functional effects of human epilepsy mutations on ion channels bearing the mutations, and (3) to utilize these models to investigate new therapeutic approaches to treat epilepsy.

In line with these efforts, the applicant has additionally been approached by several investigators to collaborate on brain slice electrophysiology to further examine the cause and therapy of epilepsy. The proposed training is hence aimed at extending the experimental repertoire of the applicant, who already has extensive experience in electrophysiology. Until very recently, this knowledge has been used in pharmacological experiments assessing the block of inwardly-rectifying potassium (Kir) channels by antipsychotics (*JPET* 320:573), antidepressants (*Brain Res*, submitted), and antiepileptic agents (unpublished). In a related project, Dr. Lossin has been examining the functional and biochemical effects of various genetic Kir channel alterations associated with epilepsy (unpublished).

Another, recently started endeavor involves aminoglycoside antibiotics, which represent a cornerstone in today's defense against bacterial infections. Their main action lies in recoding the ribosome/t-RNA interaction such that prokaryotic protein synthesis becomes seriously compromised and ultimately ceases. This effect is also seen in eukaryotic protein synthesis, albeit not to the same degree. It can be shown, however, that aminoglycosides have the ability to suppress otherwise terminating codons, which is of interest in the context of inheritable disease caused by premature stop codon mutations (*JCI* 104:375). The applicant is currently applying for support to examine whether aminoglycoside could, in principal, work as a novel treatment modality for truncation-mediated ion channel epilepsy. Experiments evaluating this possibility *in vitro* and *in vivo* using heterologous expression are now being prepared. Experimental success provided, aminoglycoside treatment of epilepsy has to be evaluated in a more natural setting. To that end, discussions are underway to prepare knock-in mice harboring the respective mutants. A thorough brain slice characterization of these animals will be necessary aside from acutely dissociated whole-cell patch clamp experiments, to assess the true effects of the introduced mutation.

Curriculum vitae

MARIA F.M. BRAGA

2007

PERSONAL DATA:

Name: **Maria F.M. Braga**
Employment Address: Uniformed Services University of the Health Sciences
Department of Anatomy, Physiology and Genetics
4301 Jones Bridge Rd.
Bethesda, Maryland, 20814
Telephone:
e-mail:

CURRENT APPOINTMENT:

2004-Present Assistant Professor – Department of Anatomy, Physiology and Genetics, Uniformed Services University of the Health Sciences, Bethesda, MD.
2004-Present Assistant Professor – Department of Psychiatry, Uniformed Services University of the Health Sciences, Bethesda, MD.
2005-Present Assistant Professor of Neuroscience, Uniformed Services University of the Health Sciences, Bethesda, MD.

EDUCATION:

Doctor of Philosophy in Physiology and Pharmacology (Ph.D.), Department of Physiology and Pharmacology, University of Strathclyde, Scotland - 1993.
Master of Science in Pharmacology (M.S.), Department of Biochemistry and Pharmacology, University of Sao Paulo - School of Medicine, Brazil -1986.
Doctor of Dental Surgery (D.D.S.), School of Dentistry, Federal University of Alagoas, Brazil - 1983.

RESEARCH AND EMPLOYMENT EXPERIENCE:

2004-Present Assistant Professor, Uniformed Services University of the Health Sciences, Department of Anatomy, Physiology and Genetics.
2000-2004 Research Assistant Professor, Uniformed Services University of the Health Sciences, Department of Psychiatry.
1996-2000 Postdoctoral Fellow, University of Maryland, Department of Pharmacology and Experimental Therapeutics.
1994-1996 Associate Professor in the Institute of Biophysics, Federal University of Rio de Janeiro, Brazil.
1993-1994 Postdoctoral Fellow, University of Strathclyde and Strathclyde Institute for Drug Research, Glasgow, Scotland.
1989-1992 Ph.D. Student at the Department of Physiology and Pharmacology, University of Strathclyde, Scotland.
1986-1988 Assistant Professor of Pharmacology, Department of Physiology and Pharmacology, Federal University of Alagoas, Brazil.

SCIENTIFIC ORGANIZATIONS:

American Association for the Advancement of Science; The New York Academy of Science and The Society for Neuroscience.

RESEARCH SUPPORT:

1 U01 NS058162-01 10/01/2006 - 09/30/11

National Institute of Neurological Disorders and Stroke - NIH

Principal Investigator: Maria F.M. Braga

Project Title: Efficacy of GluR5 Antagonists Against Soman-Induced Seizures and Neuropathology

The goal of this project is to determine the efficacy of two GluR5-containing kainate receptor antagonists against soman-induced seizures and neuropathology. The efficacy of these antagonists against seizures will be correlated with their efficacy in preventing brain pathology, as well as pathophysiological alterations in the amygdala and hippocampus, studied *in vitro* after *in vivo* exposure to soman.

Role: Principal Investigator

1.E0021-07-US-C 10/01/2006 – 09/30/2009

Defense Threat Reduction Agency

Principal Investigator: Maria F.M. Braga

Title: Efficacy of GluR5 Kainate Receptor Antagonists and Caramiphen against Nerve Agent-Induced Brain Seizures and Neuronal Damage

The major goals of this project is 1) to determine the involvement of the GABAergic and glutamatergic neurotransmission systems in the mechanisms by which the nerve agent SARIN induces brain seizures, and 2) to determine whether a novel and an FDA-approved, mixed GluR5 kainate receptor antagonist, alone or in combination with the anticholinergic agent caramiphen, can prevent the initiation or block the expression of SARIN-induced seizures.

Role: Principal Investigator

F170TM-C4 05/01/2006 – 04/31/2008

Department of Defense - Defense Brain and Spinal Cord Injury Program

Principal Investigator: Maria F.M. Braga

Title: Epileptogenesis in the Amygdala and the Role of GluR5 Kainate Receptors

The major goal of this project is to determine the role of GluR5 kainate receptors in epileptogenesis, which is the process whereby progressive, pathophysiological alterations in neuronal networks after an acute brain insult, such as traumatic brain injury, lead to the development of epilepsy.

R070SG 06/30/2005-09/30/2008

Department of Defense – USUHS

Principal Investigator: Maria F.M. Braga

Title: GABAergic Transmission in the Amygdala and Anxiety Disorders

This study investigates alterations in GABAergic synaptic transmission in fear-conditioned mice.

Role: Principal Investigator

USO0488HQ 03/01/2004-02/28/2006

Maria F.M. Braga, DDS, PhD

Department of Defense - USUHS
Co-Investigator: Maria F.M. Braga

Title: Protection of Traumatic Stress-Induced Adrenergic Impairment of the Amygdala
This study investigates the effectiveness of α_{1A} adrenoceptor antagonists in preventing the stress-induced alterations in the excitability of the amygdala.
Role: Co-Investigator

PUBLICATIONS:

Vassiliki Aroniadou-Anderjaska, Felicia Qashu and **Maria F.M. Braga**. (2007). Mechanisms regulating GABAergic inhibitory transmission in the basolateral amygdala: implications for epilepsy and anxiety disorders. *Amino Acids*, **32(3):305-15**.

Maria F. M. Braga, Vassiliki Aroniadou-Anderjaska and He Li. (2004). The physiological Role of Kainate Receptors in the Amygdala. *Molecular Neurobiology*, **30(2):127-42**.

Maria F.M. Braga, Edna F.R. Pereira, Arpad Mike, Edson X. Albuquerque. (2004). Pb^{2+} via protein kinase C inhibits nicotinic cholinergic modulation of synaptic transmission in the hippocampus. *Journal of Pharmacology and Experimental Therapeutics*, **311(2): 700-710**.

Maria F. M. Braga, Christopher J. Hough, Sean T. Manion, Vassiliki Aroniadou-Anderjaska, and He Li. (2004). Stress impairs α_{1A} adrenoceptor-mediated noradrenergic facilitation of GABAergic transmission in the basolateral amygdala. *Neuropsychopharmacology*, **29(1): 45-58**.

Maria F. M. Braga, Vassiliki Aroniadou-Anderjaska, Jianwu Xie, and He Li. (2003). Bidirectional Modulation of GABA Release by Presynaptic Glutamate Receptor 5 Kainate Receptors in the Basolateral Amygdala. *Journal of Neuroscience*, **23 (2): 442-452**.

Maria F. M. Braga, Vassiliki Aroniadou-Anderjaska, Robert M. Post and He Li. (2002). Lamotrigine reduces spontaneous and evoked GABA_A receptor-mediated synaptic transmission in the basolateral amygdala: Implications for its effects in seizure- and affective disorders. *Neuropharmacology*, **42: 522-529**.

Emerson P. Pecanha, Carlos A.M.Fraga, Eliezer J. Barreiro, **Maria F.M. Braga**, Edna F.R. Pereira and Edson X. Albuquerque. (2001). Synthesis and Pharmacological Evaluation of a New 2-Azabicyclo[3.3.0]octane Derivative. *Journal of the Brazilian Chemical Society*, **12: 408-412**.

Manickavasagam Alkondon, **Maria F.M. Braga**, Edna F.R. Pereira, Alfred Maelicke, Edson X. Albuquerque. (2000). $\alpha 7$ Nicotinic acetylcholine receptors and modulation of gabaergic synaptic transmission in the hippocampus. *European Journal of Pharmacology* **393: 59-67**.

Maria F.M. Braga, Edna F.R. Pereira, Edson X. Albuquerque. (1999). Nanomolar concentrations of lead inhibit glutamatergic and GABAergic transmission in hippocampal neurons. *Brain Research* **826: 22-34**.

Maria F.M. Braga, Edna F.R. Pereira, Murilo Marchioro, Edson X. Albuquerque. (1999). Lead increases tetrodotoxin-insensitive spontaneous release of glutamate and GABA from

hippocampal neurons. ***Brain Research* 826**: 10-21.

Edson X. Albuquerque, Edna F.R. Pereira, **Maria F.M. Braga**, Manickavasagom Alkondon. (1998). Contribution of nicotinic receptors to the function of synapses in the central nervous system: The action of choline as a selective agonist of $\alpha 7$ receptors. ***Journal of Physiology* (Paris) 92**: 309-316.

Edson X. Albuquerque, Edna F.R. Pereira, **Maria F.M. Braga**, Hiroaki Matsubayashi, Manickavasagom Alkondon. (1998). Neuronal nicotinic receptors modulate synaptic function in the hippocampus and are sensitive to blockade by the convulsant strychnine and by the anti-Parkinson drug amantadine. ***Toxicology Letters* 102-103**: 211-218.

Camara A.L., **Braga, M.F.M.**, Rocha E.S., Santos, M.D., Cortes W.S., Cintra W.M., Aracava Y., Maelicke A., Albuquerque E.X. (1997). Methamidophos: an anticholinesterase without significant effects on postsynaptic receptors or transmitter release. ***Neurotoxicology* 18** (2): 589-602.

Henning R.H., Rowan E.G., **Braga M.F.M.**, Nelemans A., Harvey A.L. (1996). The prejunctional inhibitory effect of suramin on neuromuscular transmission in vitro. ***European Journal of Pharmacology* 301** (1-3): 91-97.

Braga M.F.M., Rowan E.G., Harvey A.L. (1995). Modification of ionic currents underlying action potentials in mouse nerve terminals by the thiol-oxidizing agent diamide. ***Neuropharmacology* 34** (11): 1529-33.

Braga M.F.M. & Rowan E.G. (1994). The pharmacological effects of cadmium on skeletal neuromuscular transmission. ***General Pharmacology* 25** (8): 1729-1739.

Braga M.F.M., Rowan E.G., Harvey A.L., Bowman, W.C. (1994). Interactions between suxamethonium and non-depolarizing neuromuscular blocking drugs. ***British Journal of Anaesthesia* 72**: 198-204.

Braga M.F.M., Rowan E.G., Harvey A.L., Bowman W.C. (1993). A prejunctional action of neostigmine on mouse neuromuscular preparations. ***British Journal of Anaesthesia* 70**: 405-410.

Braga M.F.M., & Rowan E.G. (1992). Reversal by cysteine of the cadmium-induced block of skeletal neuromuscular transmission in vitro. ***British Journal of Pharmacology* 107**: 95-100.

Braga M.F.M., Anderson A.J., Harvey A.L., Rowan E.G. (1992). Apparent block of K^+ currents in mouse motor nerve terminal by tetrodotoxin, μ -conotoxin and reduced sodium concentrations. ***British Journal of Pharmacology* 106**: 91-94.

Braga M.F.M., Harvey A.L., Rowan E.G. (1991). Effects of tacrine, velnacrine (HP029), suronacrine (HP128) and 3,4-diaminopyridine on skeletal neuromuscular transmission in vitro. ***British Journal of Pharmacology* 102**: 909-915.

CONFERENCE PROCEEDINGS:

M.F. M. Braga, H. Li and M. A. Rogawski. (2003). Topiramate Enhances GABAergic Transmission and Blocks GluR5 Kainate Receptors in Basolateral Amygdala Interneurons. Society for Neuroscience Abstracts 33: 582.15.

He Li, Christopher J. Hough, Sean T. Manion, V. Aroniadou-Anderjaska, and **Maria Braga**. (2003). Stress impairs α_{1A} adrenoceptor-mediated noradrenergic facilitation of GABAergic transmission in the basolateral amygdala. Society for Neuroscience Abstracts 33: 888.15.

Sean T. Manion, **Maria F.M. Braga** and He Li. Effects of traumatic stress on noradrenergic-mediated modulation of neuronal excitability and neuroplasticity in the basolateral amygdala. (2003). Society for Neuroscience Abstracts 33: 792.10.

Maria F. M. Braga, Vassiliki Aroniadou-Anderjaska, Sean T. Manion, Christopher J. Hough, and He Li. (2003). Stress impairs α_{1A} adrenoceptor-mediated noradrenergic facilitation of GABAergic transmission in the basolateral amygdala. **Faculty Senate Research Day and Graduate Student Colloquia: From Bench to Bedside and Battlefield: Translational Research at the Nation's Medical School**. USUHS, Bethesda, MD.

Maria F. M. Braga and He Li. (2003). Topiramate Blocks Glutamate Receptor 5 Kainate Receptors in Basolateral Amygdala Interneurons: Implications for its effectiveness in Epilepsy and PTSD. Faculty Senate Research Day and Graduate Student Colloquia: **From Bench to Bedside and Battlefield: Translational Research at the Nation's Medical School**. USUHS, Bethesda, MD.

M.F.M. Braga, C.J. Hough, S. Manion, and H. Li. (2002). Chronic stress causes impairment of α_1 -adrenoceptor-mediated modulation of GABAergic synaptic transmission in the basolateral amygdala. Society for Neuroscience Abstracts 32: 103.10.

He Li, Vassiliki Aroniadou-Anderjaska, Jianwu Xie, and **Maria F. M. Braga**. (2002). Bidirectional Modulation of GABA Release Mediated by GluR5 Kainate Receptors in the Basolateral Amygdala. Society for Neuroscience Abstracts 32: 440.1.

C.J. Hough, **M.F.M. Braga**, and H. Li. (2002). GluR5-Containing Kainate Receptors of the Basolateral Amygdala are inhibited by Calcium and Zinc. Society for Neuroscience Abstracts 32: 541.6.

Maria F.M. Braga, Edna F.R. Pereira and Edson X. Albuquerque. (1999). The modulation of GABA and glutamate release by nicotinic receptors (nAChRs) in hippocampal neurons is blocked by Pb^{2+} . Society for Neuroscience Abstracts 25: 892.11.

E.F.R. Pereira, **M.F.M. Braga** and E.X. Albuquerque. (1999). α_7 and $\alpha_4\beta_2$ like nicotinic receptors (nAChRs) control glutamate and GABA release from hippocampus neurons in culture. Society for Neuroscience Abstracts 25: 892.8.

M.F.M. Braga, E.F.R. Pereira, M. Eldefrawi, E.X. Albuquerque. (1999). α_7 and $\alpha_4\beta_2$ nicotinic receptors modulate spontaneous and evoked release of GABA from hippocampus neurons. Biophysical Journal, Volume 76, Number 1,2, Page: A371.

M.F.M. Braga, E.F.R. Pereira, E.X. Albuquerque. (1998). α_7 and $\alpha_4\beta_2$ nicotinic receptors (nAChR) modulate evoked and spontaneous release of GABA from hippocampus neurons.

Society for Neuroscience Abstracts 24: 624.9.

Edna F.R. Pereira, **Maria F.M. Braga**, Edson X. Albuquerque. (1998). Lead (Pb^{2+}) blocks modulation of GABA release by nicotinic receptors in hippocampal neurons in culture. Society for Neuroscience Abstracts 24: 624.4.

E.X. Albuquerque, E.F.R. Pereira, **M.F.M. Braga**. (1998). A basal $\alpha 4\beta 2$ nicotinic receptor (nAChR) activity controls the release of GABA from hippocampal neurons. Society for Neuroscience Abstracts 24: 623.7.

Y. Aracava, E.S. Rocha, **M.F.M. Braga**, E.X. Albuquerque. (1998). The pesticide Aldicarb blocks the GABA_A receptor activity in hippocampal neurons. Society for Neuroscience Abstracts 24: 624.6.

M.F.M. Braga, E.X. Albuquerque, E.F.R. Pereira. (1998). Nanomolar concentrations of Pb^{2+} increase spontaneous and block evoked transmitter release in hippocampal neurons. Proceeding of the International Congress of Toxicology - ICT VIII, Paris, France.

M.F.M. Braga, M. Marchioro, A.T. Eldefrawi, E.X. Albuquerque. (1997). Lead (Pb^{2+}) increases spontaneous and blocks evoked transmitter release in rat hippocampal neurons. Society for Neuroscience Abstracts 23: 888.2.

A.L. Camara, **M.F.M. Braga**, Y. Aracava, W.M. Cintra, E.S. Rocha, W.S. Cortes, C.T. Barbosa, E.X. Albuquerque. (1997). Acetylcholinesterase as a specific target for Methamidophos (METH). The Toxicologist 36: 71. Society of Toxicology Annual Meeting, Cincinnati, Ohio.

M. Marchioro, M. Alkondon, **M.F.M. Braga**, Y. Aracava, K.L. Swanson, E.X. Albuquerque. (1997). Lead stimulates transmitter release and affects NMDA-mediated postsynaptic currents in cultured hippocampal neurons. The Toxicologist 36: 67. Society of Toxicology Annual Meeting, Cincinnati, Ohio.

N.G. Castro, M.D. Santos, A.L. Camara, L.E.F. Almeida, **M.F.M. Braga**, Y. Aracava, E.X. Albuquerque. (1996). Methamidophos, but not Aldicarb, is a pure cholinesterase inhibitor. Society for Neuroscience Abstracts 22: 502.24.

S.R. Chebabo, O.V. Sousa, **M.F.M. Braga**, Y. Aracava, E.X. Albuquerque. (1996). Effects of Aldicarb on neurotransmitter release and neuronal excitability. Society for Neuroscience Abstracts 22: 686.12.

M.F.M. Braga, O.V. Sousa, M.D. Santos, L.E.F. Almeida, W.S. Cortes, W.M. Cintra, Y. Aracava, E.X. Albuquerque. (1995). Effects of the pesticide Aldicarb on cholinergic transmission. Society for Neuroscience Abstracts 21: 432.1.

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TECHNICAL EXPERTISE:

Electrophysiology:

- Whole-cell patch clamp recordings from amygdala and hippocampal slices of rats by using infrared-assisted video microscopy coupled with computerized micromanipulators.
- Fluorescence imaging of the dye-filled neurons and a laser scanning confocal microscopy.
- Whole-cell patch clamp recordings from primary cultures of rat hippocampal neurons, rat dorsal root ganglia and rat myoballs, as well as, SK-N-MC neuroblastoma and PC12 cells.
- Intracellular and field potential recordings from brain slices.
- Single channel recordings from cell-attached patches of rat myoballs and hippocampal neurons in culture.
- Two microelectrode voltage clamping of the muscle fibers of the mouse triangularis sterni, rat and mouse hemidiaphragm and frog sartorius nerve/muscle preparations.
- Extracellular recordings from the perineural sheath of the intercostal nerve innervating the mouse triangularis sterni muscle, and of the motor nerve innervating the frog cutaneous pectoris muscle.
- Intracellular recordings from the muscle fibers of the mouse triangularis sterni, rat and mouse hemidiaphragm, frog cutaneous pectoris and frog sartorius nerve/muscle preparations.

Experience with software for data analysis:

PC based: pClamp (Axon Instruments), SCAN (J. Dempster), CDR (J. Dempster) and Origin (Microcal).

Cell Culture:

- Preparation and maintenance of primary cultures of rat hippocampal neurons, rat dorsal root ganglia and rat myoballs and maintenance of a variety of cell lines (PC12, SK-N-MC neuroblastoma, HEK 293 cells).

Twitch-tension preparations *in vitro*:

- Rat and mouse phrenic-nerve hemidiaphragm-muscle, chick biventer cervicis muscle and Frog sciatic-nerve sartorius-muscle preparations. Agonist-induced contracture of rectus abdominis muscle of frog.

***in vitro* Smooth muscle preparations:**

- Isolated ileum from guinea pig or rat, isolated strip from the left atria, right ventricle or papillary muscle from guinea pig or rat, isolated ileum, jejunum and vas deferens from rat.

- Isolated heart preparations perfused or superfused with physiological solutions (isolated work-performing or Langendorff).