

NONNA A. OTMAKHOVA, Ph. D.

53 Upland Road, Waltham, MA 02451

781-894-2470 (home), 781-330-1569 (cell), notmakhova@gmail.com.

Experienced Scientist with in-depth knowledge of neuroscience and electrophysiology *in vitro* (MEA System, whole-cell patch clamp, field potential recording from brain slices) and *in vivo* (EEG, single spikes). Hands-on experience with multiple behavioral methods, animal models of depression, anxiety, drug addiction, epilepsy. Able to set up a laboratory, organize, plan and supervise research. Proficient with various electrophysiological software systems. Ph.D. in Human and Animal Physiology/ Neurophysiology; M.S. in Biophysics. Author of more than 30 peer-reviewed publications.

PROFESSIONAL EXPERIENCE

Lundbeck Research USA, Paramus, NJ.

2005-2007

Senior Scientist

- Set up a modern *in vitro* slice electrophysiology lab with two rigs. Successfully used it for mechanistic research for four GPCR related projects and electrophysiological validation for an animal model of anxiety/depression.
- Designed and implemented conventional rig to enable simultaneous whole-cell and two field potential stimulation/recording channels (two synaptic systems or two slices recording) under DIC visual control. Designed approaches and implemented target validation mechanistic studies for one early “incubator” project, one drug discovery project and the analysis of animal model of anxiety/depression.
- Adopted multi-electrode array (MEA) system software to provide simultaneous field potential stimulation/recording from 3 independent hippocampal synaptic systems. Drug actions in two synaptic systems with GPCR of interest and a third synaptic system where this GPCR was absent (negative control) were analyzed simultaneously on each slice. This system was used for one drug discovery project and two early “incubator” target validation projects.
- Developed slicing/MEA recording for multi-spike recording from VTA and cerebellum acute slices (5-25 cells from a single slice). Tested three reference compounds for an early “incubator” target validation project in 2 weeks (~ 150 neurons recorded).

Brandeis University, Waltham, MA

Research Scientist, Department of Biology

1999 - 2005

- Discovered unusual properties and a large contribution of NMDA channels to the field potentials in direct cortical input to the CA1 field of the hippocampus; hypothesized a possible connection to mechanisms of schizophrenia (NMDA model); received 2001 NARSAD Young Investigator Award to continue these studies.
- Set up a second rig for whole-cell recording from the two CA1 synaptic inputs. Confirmed a higher NMDA contribution in the direct cortical input.
- Discovered the role of I_h channels in the control of direct cortical input; investigated GABA_A and GABA_B inhibition in the two CA1 synaptic inputs.
- Supervised electrophysiological training of graduate and undergraduate students. Four undergraduate students under my guidance published their experimental work before graduation from Brandeis University.
- Eleven peer-reviewed publications, one - in preparation.

Fellow, Department of Biology**1994-1999**

- Designed and implemented studies of dopamine and noradrenaline effects on hippocampal synaptic plasticity (LTP, LTD, depotentiation); based on these studies received NIH INRSA award
- Discovered input-specific effects of dopamine on the direct cortical input to the CA1 field of the hippocampus; suggested a connection to mechanisms of schizophrenia (monoamine model); for this discovery received 1997 NARSAD Young Investigator Award and a 1998 Scottish Rite Schizophrenia Research Program award.

University of Iowa, Iowa City, IA**Fellow, Department of Psychiatry****1991 - 1994**

- Set up 8-cage open field behavior monitoring (“OMNI” computerized automatic system), plus-maze and learned helplessness behavioral methods
- Analyzed functional asymmetry in behavioral response to lateralized dopamine microinjections into nucleus accumbens and substantia innominata

Institute of Biophysics, Moscow Region, Russia**Research Scientist**

- Six publications on the analysis of the olfactory bulbectomy model of depression in mice: behavior, brain biochemistry, histology, and pharmacology; secondary effects of bulbectomy on voluntary alcohol consumption, seizure susceptibility; strain-dependence of the effects of bulbectomy (DBA/2j vs. C57Bl/6j mice).
- Four publications on locomotor asymmetries in epilepsy prone and resistant rats, relations between lateralization and seizure susceptibility.
- Five publications on EEG studies of human functional asymmetry: different hemisphere involvement during memorization of words, numbers, and music; sex differences in human functional asymmetry
- Two publications on EEG and single unit recordings from awake rats and rabbits under normal conditions and during microwave irradiation

EDUCATION

- **Ph.D.** in Human and Animal Physiology/Neurophysiology at Moscow State University.
- **M.S.** in Biophysics at Gorky State University.

COMPUTER SKILLS

- Proficient user of standard software (Microsoft Word, Excel, PowerPoint; Microcal Origin; CorelDraw; Adobe Acrobat)
- Experienced user of electrophysiological software (MC_Rack /Stimulus/ Data tool; Neuroexplorer; PatchMaster; Igor Pro)

PROFESSIONAL AFFILIATIONS - Society for Neuroscience since 1993**AWARDS**

2001 - 2004	NARSAD Young Investigator Award.
1998 - 2000	The Supreme Council 33 ^o Scottish Rite Schizophrenia Research Program
1997 - 2000	NARSAD Young Investigator Award.
1997 - 1999	1F32 MH11720-01 NIH INRSA Award.

SELECTED PUBLICATIONS

- Lisman JE, Raghavachari S, Otmakhov N, **Otmakhova NA** (2005) The phases of LTP: the new complexities. In: Synaptic Plasticity and Transsynaptic Signaling (Stanton PK, Bramham C, Scharfman HE, eds), pp 343-357: Springer Science and Business Media.
- Otmakhova NA**, Lewey J, Asrican B, Lisman JE (2005) Inhibition of perforant path input to the CA1 region by serotonin and noradrenaline. *J Neurophysiol* 94:1413-1422.
- Otmakhova, N. A.** and J. E. Lisman (2004). "Contribution of Ih and GABAB to synaptically-induced afterhyperpolarizations in CA1: a brake on the NMDA response." *J Neurophysiol*. 92: 2027-2039.
- Otmakhov N, Khibnik L, **Otmakhova N**, Carpenter S, Riahi S, Asrican B, Lisman J (2004) Forskolin-induced LTP in the CA1 hippocampal region is NMDA receptor dependent. *J Neurophysiol* 91:1955-1962.
- Otmakhova NA**, Otmakhov N, Lisman JE (2002) Pathway-specific properties of AMPA and NMDA-mediated transmission in CA1 hippocampal pyramidal cells. *J Neurosci* 22:1199-207.
- Lisman JE, **Otmakhova NA** (2001) Storage, recall, and novelty detection of sequences by the hippocampus: elaborating on the SOCRATIC model to account for normal and aberrant effects of dopamine. *Hippocampus* 11:551-68.
- Otmakhova NA**, Otmakhov N, Mortenson LH, Lisman JE (2000) Inhibition of the cAMP pathway decreases early long-term potentiation at CA1 hippocampal synapses. *J Neurosci* 20:4446-51.
- Otmakhova NA**, Lisman J (1999). Dopamine selectively inhibits the direct cortical pathway to the CA1 hippocampal region. - *J Neurosci*, 19(4): 1437-1445.
- Otmakhova NA**, Lisman J (1998). D1/D5 dopamine receptors inhibit depotentiation at CA1 synapses via cAMP-dependent mechanism. - *J Neurosci*, 18(4): 1270-1279.
- Nesterova IV, Gurevich EV, Nesterov VI, **Otmakhova NA**, Bobkova NV (1997). Bulbectomy-induced loss of raphe neurons is counteracted by antidepressant treatment. - *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 21: 137-140.
- Otmakhova NA**, Lisman J (1996). D1 dopamine receptor activation increases the magnitude of early LTP in CA1 hippocampal synapses. - *J Neurosci*, 16(23), 7478-7486.
- Katkov YA, **Otmakhova NA**, Gurevich EV, Nesterova IV, Bobkova NV (1994) Antidepressants suppress bulbectomy-induced augmentation of voluntary alcohol consumption in C57Bl/6j but not in DBA/2j mice. - *Physiol. & Behav*: 56, 501-509.
- Gurevich EV, Alexandrova IY, **Otmakhova NA**, Katkov YA, Nesterova IV, Bobkova NV (1993) Effects of bulbectomy and subsequent antidepressant treatment on brain 5-HT₂ and 5-HT_{1A} receptors in mice. - *Pharmacol. Biochem. & Behavior*: 45, 65-70.
- Otmakhova NA**, Gurevich EV, Katkov YA, Nesterova IV, Bobkova NV (1992). Dissociation of multiple behavioral effects of olfactory bulbectomy between C57Bl/6j and DBA/2j mice. - *Physiol. & Behavior*: 52, 441-448.
- Otmakhova NA** (1990) [Characteristics of lateralization in rats prone to audiogenic epilepsy]. - *Zhurnal Vyssei Nervnoi Deyatelnosti (USSR)*: 40(1), 151-155
- Otmakhova NA** (1989). [Sex differences in some forms of motor asymmetry in rats]. - *Journal of Evolutionary Biochemistry and Physiology*: 25(5), 446-450
- Konovalov VF, **Otmakhova NA**. (1989). [Effects of lateralized electric stimulation of the brain on audiogenic convulsions in rats]. - *Bulletin of Experimental Biology and Medicine*: 108(7), 920-22

Otmakhova NA, Kononov VF. (1988). [Interhemispheric differences and the interaction of the hemispheres]. - Uspekhi Fiziologicheskikh Nauk (USSR): 19(1), 88-108