

Personal information

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Date & place of birth: February 7, 1955; Dnepropetrovsk, Ukraina
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Academic information**Education**

1981: Moscow State Lomonosov University, Biological Faculty:
Physiology, Neurophysiology, Higher Brain Functions
1994: Ph.D. in Neurophysiology, Graduation Date: November 28, 1994
Department of High Nervous Activity of Biology Faculty Lomonosov State University
in Moscow, PhD Thesis: "Neurophysiological analysis of the effect of mediatory
aminoacid receptor agonists and antagonists on EEG in rat brain"
Supervisor: Prof. A. Yu. Budantsev.

Professional Experience:

2004-present Research Scientist, Center for Adaptive Neural Systems at the Arizona State
University

- Studies of new therapeutic targets for spinal cord injury. Supervisor: Dr. Ranu Jung, PhD.

2001-2004 Staff Scientist, Thomas H. Christopher Center for Parkinson's Research, Sun Health
Research Institute

- Studies of new therapeutic targets for Parkinson's disease. Investigations of novel compounds in models of Parkinson's, and application of behavioural, histochemical and neurochemical techniques to the assessment of their effects (ref. 19). Supervisor: Dr. Jeffrey N. Joyce, Ph.D.

1998-2001 Research Professor, laboratory of Neuroendocrinology of C.U.I.B. (Centro
Universitario de Investigaciones Biomedicas), University of Colima, Mexico.

- Studies of central mechanisms that regulate glucose level in blood and brain glucose retention (ref. 16, 17,18, 20). Supervisor: Dr. Ramon Alvares-Buylla de Aldana (died in 1999).

1992-1998 Post-Doctoral Fellow, Laboratory of Functional Neurochemistry, Institute of
Experimental and Theoretical Biophysics, Pushchino, Moscow Region, Russia.

- Functional-neurochemical studies of rat brain cholinergic system in state depending learning (ref. 14, 15). Supervisor: Prof. Budantsev A.Yu.; DS, PhD.
- Studies of electrical activity of rat brain under central administration of various doses of mediatory system receptor agonists and antagonists. (ref. 4, 5, 9, 10, 12, 13). Supervisor: Dr. Kovalev G.I.; DS, PhD.
- Participation in creation of original computer version of the rat brain atlas (ref. 11 and 1, 2 (manuals and computer programs). Supervisor: Prof. Budantsev A.Yu.; DS, PhD.

1989-1992 Research Fellow at the Laboratory of Medical Biophysics, Institute of Biological Physics, the USSR Academy of Sciences.

- Studies in the field of hibernation: effects of the substances thought to be "Hibernation triggers" on behaviour of rats and biopotentials of their brains (ref. 1, 2, 3, 7, 8). Supervisor: Dr. Ignat'ev D.D., PhD.
- Studies of electrical activity of the animal brain under perfluoro-carbon administration (ref. 6). Supervisor: Dr. Sologub G.R., DS, PhD.

1985-1988 Postgraduate student, Institute of Biological Physics, the USSR Academy of Sciences.

- Neurophysiological analysis of the effect of mediatory aminoacid receptor agonists and antagonists on EEG in rat brain. Supervisor: Dr. Kovalev G.I., DS, PhD.

1981-1984 Research Fellow of "Radon" Co.

- Effects of radiation on the environment.

Membership

Russian Neurochemistry Society

SNI (Sistema Nacional de Investigadores) of Mexico, level 1, 2000-2003, Member ID #21396.

Society for Neuroscience, 2002 – present, Member ID # 100014934

Research

My research interests are related to understanding the principles of functioning of the neurotransmitter systems involved into control of motor system. This research provides a unique possibility to make a purposeful change of neurotransmitter system activities which is known to result in alterations in behavior of both physiological system and the whole organism. We are exploiting complementary advantages of a combination of different experimental and theoretical approaches, including deep brain stimulation (DBS), stereotaxic injection into brain, behaviour techniques, modelling of neurotransmitter system interactions, and elaborated data analysis. We have used these approaches in our recent research project aimed at PD. To predict possible targets for pharmacological effect which should be used to increase the positive effect of DBS we have created a theoretical model of neurotransmitter interactions into Striatum. This model has shown that NK1 and kappa receptors closely related with dopaminergic neural circuits are most likely to effect DBS. Our following studies on experimental Parkinsonism induced by 6-OHDA neurotoxins have shown the increase of positive effect of DBS for NK1 agonist and kappa antagonists, while NK1 antagonist and kappa agonist have revealed a negative effect for DBS. My other research interest is related to neurodegeneration process as a result of incomplete spinal cord injury (iSCI). In particular, I am interested in the interaction of neurotransmitter systems involved into motor function of spinal cord and in the possibility to improve the condition and increase of the rehabilitation process using functional neuromuscular stimulation (FNS) and stimulation caused by receptors involved in spinal cord neural circuits.

Teaching experience

1. Lectured course on "Stereotaxic Methods in Neurobiology". Pushchino State University, Department of Neurobiology, Russia.
2. Lectured course on "Biological Foundations of Human and Animals". Moscow Academy of Instrument-Making and Computer Science, Department of Biological and Medical Devices, Russia.
3. Lectured course on "Cryotomia and Stereotaxic Methods". Colima University, BioMedicine Department, Mexico.

4. Practical course on "Primary Culture of Rat Hepatocytes". Colima University, BioMedicine Department, Mexico.
5. Lectured course on "Endocrine Physiology" Colima University, BioMedicine Department, Mexico.

Publications

Articles:

1. Ignat'ev D.D., Vorobjov V.V., Kruman I.I., Yarkov A.V. Effect of 1000-10000 Dalton fraction of blood serum from hibernating and active ground squirrel on bioelectrical activity of rat brain cortex. In: Mechanisms of hibernation. 1987, Pushchino, Rus., pp. 127-132.
2. Ignat'ev D.D., Vorobjov V.V., Yarkov A.V., Sviryaev V.I. Change of the rat brain bioelectrical activity after administration of 1-10 kD fraction isolated from the brain of hibernating ground squirrel. In: Living in the cold.II. (Eds. Malan F., and Canguilhem B.), 1989, pp. 44-46.
3. Ignat'ev D.D., Vorobjov V.V., Yarkov A.V., Sviryaev V.I. Effects of injection of hibernating ground squirrel *tellus undulatus* brain fraction 1-10 kD into homoiotherms In: "Signal molecules and mechanisms of an animal behaviour", Pushchino, 1989, pp.23-24.
4. Yarkov A.V., Vorobjov V.V., Galtchenko A.A. and Kovalev G.I. Electrical activity of the hippocampus in rats under centrally administered GABA agonists and antagonists. *Fiziol. Zh. SSSR Im. I. M. Sechenova*, (Rus.), V.75(12), 1989, pp.1677-1685.
5. Yarkov A.V., Vorob'ev V.V., Gal'chenko A.A., Kovalev G.I. Electrical activity of the hippocampus of rats with the central administration of GABA agonists and antagonists. *Neurosci Behav Physiol* 1991 V.21(1) pp.81-88.
6. Vorobjov V.V., Yarkov A.V. Kukuschkin N.I., Sologub G.R., Gal'chenko A.A. Brain electrical activity of animals exposed to perfluorocarbon emulsions. *Patol. Fiziol. Eksp. Ter.* (Rus.), 1991, N 2, pp. 19-23.
7. Ignat'ev D.D., Vorobjov V.V., Yarkov A.V. Sviryaev V.I. The "Hibernation trigger" alters behavior and biopotentials of rat brain. *Studies in neuroscience*, N 105. Signal molecules and behavior. (Eds. Winlow W., Winogradova O.S., and Sakharov D.A.) Manchester University Press, 1991., p.213-218.
8. Ignat'ev D.D., Vorobjov V.V., Yarkov A.V. Sviryaev V.I. "Hibernation trigger" changes behavior and brain electrical activity of rat. In: *Ecologo-physiological properties of natural hypometabolic states*. (Rus.), 1992, Pushchino, pp. 117-122.
9. Iarkov A.V., Vorob'ev V.V., Kovalev G.I. The action of GABA agonists and an antagonist on the frequency structure of the electrical activity of different brain formations in rats. *Fiziol. Zh. SSSR Im. I. M. Sechenova* (Rus), 1991, V 77(11), pp. 12-20.
10. Yarkov A.V., Vorobjov V.V., Kovalev G.I. The action of agonists and an antagonist of GABA on the frequency composition of the electrical activity of various brain structures of rats. *Neurosci. Behav. Physiol.*, V 23(1), 1993, pp. 76-82.
11. Budantsev A.Iu., Kisliuk O.S., Shul'govsky V.V. Rykunov D.S., Yarkov A.V. The brain in stereotaxic coordinates. *Zh. Vyssh. Nerv. Deiat. Imeni I.P. Pavlova*, (Rus), 1993 V.43 (5), pp. 1045-1051.
12. Iarkov A.V., Kovalev G.I., Galtchenko A.A. Changes in the electrical activity of the rat brain during the central administration of different doses of GABA agonists and antagonists. *Eksp. Klin. Farmakol.* (Rus), 1994, V. 57 (4), pp. 6-11.
13. Yarkov A.V., Kovalev G.I. Comparative analysis of electrical brain activity after GABA and glutamate administration: is it possible to have correlation between specific neurochemical changes in the brain and in the EEG? *Bull. Exp. Biol. Med.* 1997 V. 124(8), pp. 776-779.
14. Budantsev A. Yu., Yarkov A.V., Ivanova J.V. Acetylcholinesterase in formation of hippocamp at the state dissociated learning evolved by physostigmine and pentobarbital administration. *Neirokimiya* (Rus), 1998, t.15, No.2, pp.137-145.
15. Budantsev A. Yu., Ivanova J.V., Yarkov A.V., Physiology analysis of the state dissociated learning evolved by physostigmine and pentobarbital administration. *Zh. Vyssh. Nerv. Deiat. Imeni I.P. Pavlova*, (Rus) V.49 (6), 1999, pp. 962-970.

16. Montero S.A., Yarkov A., Alvarez-Buylla R. Carotid chemoreceptors participation in brain glucose regulation. Role of arginine-vasopressin. *Adv. Exp. Med. Biol.*; V. 475, 2000, pp. 749-760.
17. Yarkov A., Montero S., Lemus M., E.R. de Alvarez-Buylla, and Alvarez-Buylla R., Arginine-vasopressin in nucleus of the tractus solitarius induces hyperglycemia and brain glucose retention. *Brain Research*, V. 902, 2001, pp. 212-222.
18. Montero S.A., Yarkov A., Lemus M., Mendoza H., Valles V., de Alvarez-Buylla E.R., Alvarez-Buylla R. Enhancing effect of vasopressin on the hyperglycemic response to carotid body chemoreceptor stimulation. Role of metabolic variables. *Adv. Exp. Med. Biol.* 2003;536:95-107.
19. Yarkov A.V., Hanger D., Reploge M., Joyce J.N. Behavioral effects of dopamine agonists and antagonists in MPTP-lesioned D3 receptor knockout mice. *Pharmacol. Biochem. Behav.* 2003 Dec.; 76(3-4):551-62.
20. Montero SA, Yarkov A, Lemus M, de Alvarez-Buylla ER, Alvarez-Buylla R. Carotid chemoreceptor reflex modulation by arginine-vasopressin microinjected into the nucleus tractus solitarius in rats. *Arch Med Res.* 2006 Aug; 37(6):709-16.

Manuals and computer programs:

1. Budantsev A.Yu., Kisljuk O.S. Rykunov D.S., Yarkov A.V. Brain in stereotaxic coordinates. Computer-Aided Handbook. Rus. Institute of Inform. Sist., Reg. N h34101. Moscow, 1992.
2. Budantsev A.Yu., Kisljuk O.V., Rykunov D.S., Yarkov A.V. Brain in stereotaxic coordinates. Computer-Aided Handbook. Manual, Biopress, Pushchino, 1992.

Abstracts (last 5 years):

1. Yarkov A.V., Hanger D., Reploge M., and Joyce J.N. Behavioral effects of dopamine agonists and antagonist in MPTP lesioned D3 receptor transgenic knockout mice. *Neuroscience* 2003, New Orleans, LA, USA.
2. Iarkov A.V., J. Graham^{1,2}, T. Kanchiku¹, D. Hagner, and R Jung. Location and 3D Reconstruction of Motoneurons Innervating Gastrocnemius Medialis and Tibialis Anterior in the Rat. *Neuroscience* 2005, Atlanta, GA, USA.