CURRICULUM VITAE

Prof. Alexey V. Semyanov

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DATE OF BIRTH

7 July1974

EDUCATION AND DEGREES

2002	Dr.Sc. Institute of Theoretical and Experimental Biophysics, Pushchino, Russia
1998	Ph.D. Institute of Theoretical and Experimental Biophysics, Pushchino, Russia
1996 - 1998	second M.Sc (*cum laude*) degree in Neuroscience, Pushchino State University, Russia
1991 - 1996	M.Sc. (*cum laude*) degree in Biophysics, Biological Faculty at University of Nizhny Novgorod, Russia

EMPLOYMENT

2016-	Institute Director, Institute of Neuroscience, University of Nizhny Novgorod, Russia
2014-2016	Institute Director, Institute of Biology and Biomedicine, University of Nizhny Novgorod, Russia
2014-2016	Head of Nizhny Novgorod Neuroscience Center, University of Nizhny Novgorod, Russia
2005-2016	Professor, Neurodynamics and Neurobiology Department, University of Nizhny Novgorod, Russia
2005-2014	Unit Leader, Unit of Extrasynaptic Transmission, RIKEN Brain Science Institute, Wako-shi, Japan
2002-2005	Senior Research Fellow, Department of Clinical and Experimental Epilepsy, UCL Institute of Neurology, London
1998-2002	Research Fellow, Department of Clinical Neurology, UCL Institute of Neurology, London
1998	Research Fellow, Institute of Theoretical and Experimental Biophysics, Russia
1996-1998	Junior Research Fellow, Institute of Theoretical and Experimental Biophysics, Russia
1995-1996	Senior Research Assistant, Institute of Theoretical and Experimental Biophysics, Russia

HONORS

2012-	Honorary Senior Lecturer, Institute of Neurology, UCL, London, UK
2003-2012	Honorary Lecturer, Institute of Neurology, UCL, London, UK

PROFESSIONAL MEMBERSHIPS AND SERVICE

2016-	Corresponding member of Russian Academy of Sciences
2016-	Member of University of Nizhny Novgorod Dissertation Council in physiology
2014-	Member of University of Nizhny Novgorod academic council

Society memberships

2017-	Fellow of The Physiological Society, UK
2006-	Member, Japan Neuroscience Society
2003-	Member, Brain Research Society of Finland
2002-2017	Ordinary member, The Physiological Society, UK
1999-2002	Affiliate member, The Physiological Society, UK
1999-	Member, Society for Neuroscience, USA (ID# 100006439)

Founder and Editor-in-chief

Opera Medica et Physiologica: http://www.operamedphys.org/

Editorial Board member

Cell Calcium: http://www.journals.elsevier.com/cell-calcium/editorial-board
Frontiers in Neural Circuits: http://journal.frontiersin.org/journal/neural-circuits#editorial-board

Guest associate editor

Journal of Biophotonics (2010)
Frontiers in Neuroscience (2013)

Reviewer for the following journals

Trends in Pharmacological sciences; Journal of Neuroscience; Trends in Neurosciences; Cell Reports; The Journal of Physiology; Human Molecular Genetics; Journal of Neurophysiology; Cerebral cortex; PLOS One, Frontiers in Neuroscience; European Journal of Neuroscience; Brain; Synapse; Neuroscience letters; Neurobiology of Disease; Network: Computation in Neural Systems; Scientific Reports

Reviewer for the following grants

Human Frontier Science Program; The Wellcome Trust-UK; Russian Foundation for Basic Research; Russian Science Foundation

ORGANISATION OF INTERNATIONAL MEETINGS

1. Organizer of conference “Volga Neuroscience meeting 2016”, St. Petersburg - Nizhny Novgorod, Russia, July 24-30, 2016
2. Organizer of conference “Frontiers in Biomedicine 2015”, Nizhny Novgorod, Russia, November 11-13, 2015
3. Organizer of Brain-computer interface workshop 2015, Nizhny Novgorod, Russia, October 14, 2015
4. Organizer of Symposium “Calcium signaling in astrocytes in health and decease” at The Joint Meeting of the Federation of European Physiological Societies and the Baltic Physiological Societies in Kaunas, Lithuania, August 26-29, 2015
5. Organizer of Symposium “Paradigm shift in astrocyte calcium signaling” at XII European Meeting on Glial Cells in Health and Disease, Bilbao, Spain, July 15 - 18, 2015
6. Organizing committee member of conference “Neurobiophotonics” on the River boat symposium “Topical problems of Biophotonics IV”, Nizhny Novgorod - Kazan, Russia, 21-27 July 2013
7. Organizing committee member of conference “Neuroimaging and Neurodynamics” on the River boat symposium “Topical problems of Biophotonics III”, St.Petersburg-Nizhny Novgorod, Russia, 16-22 July 2011

8. Co-organizer of international conference and workshop “Neuronal communication beyond the synaptic cleft” Mt. Naeba- Niigata, Japan, 7-9 February 2011
9. Organizing committee member of conference “Cellular Neuroimaging” on the River boat symposium “Topical problems of Biophotonics II”, Nizhny Novgorod – Samara, Russia, 19-24 July 2009
10. Organizing committee member Russian-Japanese workshop ISTC-RIKEN BSI workshop (44th Japan Workshop) “Bridging non-linear dynamics with cellular and molecular neuroscience” RIKEN Brains Science Institute, Japan, 18-19 March 2008
11. Program committee member “Neuro2007” 30th Annual Meeting of Japan Neuroscience Society (JNS), the 50th Annual Meeting of the Japanese Society for Neurochemistry (JSN) and the 17th Annual Meeting of the Japanese Neural Network Society (JNNS) Japan September 10 to 12, 2007
12. Organizing committee member Russian-Japanese workshop “Neurodynamics and Neuroimaging” on the River boat symposium “Topical problems of Biophotonics I”, Nizhny Novgorod – Moscow, Russia, 4-10 August 2007
13. Organizer - Symposium "Neuron-Glia communications in the brain" RIKEN Brain Science Institute, Wako-shi, Saitama, Japan, November 6-7, 2006
14. Organizing committee member - RIKEN Brain Science Institute Summer Program 2006 “Dynamical States in the Brain” Wako-shi, Saitama, Japan, Lecture Course: July 25 - August 4 2006
15. Program committee member - International symposium “Hippocampus and Memory” Pushchino, Russia June 25-29, 2006
16. Organizing committee member - Workshop “Frontiers in Cellular Neuroimaging 2005” RIKEN Brain Science Institute, Wako-shi, Saitama, Japan, June 17-22, 2005
17. Organizer - Research Symposium “Tonic $GABA_A$ receptor mediated conductances: from receptor to neuronal circuitry” - Joint International Meeting of The Physiological Society & FEPS, University of Bristol, UK - 20-23 July 2005

TEACHING

2005-2016 “Cellular neurophysiology” undergraduate course, 30 hours (University of Nizhny Novgorod)
2005-2016 “Modern methods in cellular neurophysiology” undergraduate course, 20 hours (UNN)
2005- Tutoring and supervising research of undergraduate and graduate students (up to 10)
2014- Founder and head of MSc program in English at Neurotechnology department (UNN)
2014-2016 Organizing teaching programmes at UNN Institute of Biology and Biomedicine (biomedical science division of UNN)

Former PhD students

1. Dr Alexey Pimashkin (PhD obtained in 2011 from UNN) – group leader at UNN
2. Dr Yu-Wei Wu (PhD obtained in 2012 from UCL) – postdoc at Stanford University
3. Dr Pei-Yu Shih (PhD obtained in 2012 from UCL) – postdoc at Purdue University
4. Dr Yulia Dembitskaya (PhD obtained in 2015 from UNN) – postdoc at Collège de France

Current PhD students

1. Ms Albina Lebedeva (PhD student from 2011, UNN)
2. Mr Maxim Doronin (PhD student from 2012, UNN)
3. Ms Olga Tyurikova (PhD student from 2014, UNN)
4. Mr Pavel Denisov (PhD student from 2015, UNN)
5. Mr Alex Plata (PhD student from 2015, UNN)

Training of postdoctoral researchers (current affiliation)

1. Dr Inseon Song (DZNE Magdeburg, Germany)
2. Dr Elena Kondratskaya (Bogomoletz Institute, Ukraine)
3. Dr Sergei Grebenyuk (Bogomoletz Institute, Ukraine)
4. Dr Sylvain Rama (French Institute of Health and Medical Research, France)
5. Dr Vetrivel Lakshmanan (University of Wurzburg, Germany)
6. Dr Tanja Brenner (University of Oxford, UK)
7. Dr Jaeyeon Koo
8. Dr Xiaofang Tang
9. Dr Ramil Afzalov
10. Dr Ilya Patrushev (Francis Crick Institute, UK)

RESEARCH FUNDING

Completed research grants

1. Human Frontier Science program – Program grant RGP0050/2006-C (2006-2009)

"Glia and extrasynaptic communication in the brain" In collaboration with 3 other international teams we investigated glial influence on synaptic transmission and plasticity.

2. Wellcome Trust a project grant (UK) (2007- 2010)

"Regulation of tonic currents through changes in extracellular GABA". In collaboration with 2 UK teams we investigated possible sources for extracellular GABA in the hippocampus.

3. Russian Federal Program "Scientific and teaching personnel of innovative Russia 2009-2013 " Grant № 02.740.11.5089 (2009-2010).

"Signaling in neuron-glia networks" We investigated age-dependence and energy substrate dependence of spontaneous Ca^{2+} transients hippocampal slices

4. Grant of the Russian Foundation for Basic Research (RFBR) (2009-2011)

" Functional relevance of astrocyte activity: effect on synaptic transmission"

5. Russian Federal Programme "Scientific and teaching personnel of innovative Russia 2009-2013 " Research Grant № 14.B37.21.0852 (2012-2013)

"Glycine receptors in neuron-glia interactions"

6. Federal Targeted Programme for Research and Development in Priority Areas of Development of the Russian Scientific and Technological Complex. Agreement № 14.591.21.0004 (2014-2015)

"Unique scientific setup for research of information processes in the brain with methods of optogenetics" 145.6 mln rub (approx. 1.8 mln euro)

7. State assignment grant, project № 2619 (2014-2016)

"Regulation of synaptic transmission and plasticity by extrasynaptic mechanisms in tetrapartite synapse" 15 mln rub

8. Federal Targeted Programme. Agreement № 14.578.21.0079 (2014-2016)

Development of optical methods for normal and pathological brain investigation 14.5 mln rub

9. Russian Foundation for Basic research grant № 14-04-00901 (2014-2016)

Mechanisms of generation and integration of calcium activity in astrocytes 1.5 mln rub

Current research grants

1. Russian Scientific Foundation grant (2016-2018)

The role of extrasynaptic signaling mediated by glutamate in norm and pathology 18 mln rub

2. Federal Targeted Programme for Research and Development in Priority Areas of Development of the Russian Scientific and Technological Complex. Agreement № 14.581.21.0016 (2015-2017)

Development of technology for the study of nervous system on the base of high resolution model of cortical structures 187.5 mln rub

3. Volkswagen Foundation grant for trilateral collaboration German-Ukrainian-Russian (2016-2018)

"Cellular mechanisms of healthy brain ageing under caloric restriction"
(total amount 250 000 euro, 83 300 euro for UNN)

4. Collaborator in DFG (Germany) research grant with Prof. Christian Henneberger and Dr. Andre Zeug (2015-2017)

"The activity of small GTPases and the morphology of astrocytes as key factors for the Ca^{2+} activity"

10 SELECTED PEER-REVIEWED PUBLICATIONS

1. Yu-Wei Wu, Xiaofang Tang, Misa Arizono, Hiroko Bannai, Pei-Yu Shih, Yulia Dembitskaya, Victor Kazantsev, Mika Tanaka, Shigeyoshi Itohara, Katsuhiko Mikoshiba, *Alexey Semyanov* Spatiotemporal Calcium Dynamics in Single Astrocytes and Its Modulation by Neuronal Activity/ Cell Calcium 2014, 55:119–129 doi:10.1016/j.ceca.2013.12.006

   This is the first demonstration that calcium events in astrocytes are not triggered but modulated by neuronal activity. This finding completely changed the view on the principles on neuron-astrocyte interaction.

2. Ivan Pavlov, Leonid P. Savtchenko, Inseon Song, Jaeyeon Koo, Alexey Pimashkin, Dmitri A. Rusakov, *Alexey Semyanov* Tonic $GABA_A$ Conductance Bidirectionally Controls Interneuron Firing Pattern and Synchronization in the CA3 Hippocampal Network / Proc Natl Acad Sci U S A. 2014 Jan 7;111(1):504-9. doi:10.1073/pnas.1308388110

   This is the first demonstration that small increase in ambient GABA concentration can promote brain rhythms while large increase suppresses rhythmic activity. This finding completely changed the view on the regulation of brain oscillations by extrasynaptic signalling.

3. Wlodarczyk AI, Xu C, Song I, Doronin M, Wu Y, Walker M, *Semyanov A* Tonic $GABA_A$ conductance decreases membrane time constant and increases EPSP-spike precision in hippocampal pyramidal neurons / Front Neural Circuits 2013 7:205. doi:10.3389/fncir.2013.00205

   This is the first evidence that changes in the membrane conductance mediated by ambient GABA affect EPSP-spike precision. This finding demonstrates novel role of tonic $GABA_A$ conductance in neuronal computations.

4. Pei-Yu Shih, Leonid P. Savtchenko, Naomi Kamasawa, Yulia Dembitskaya, Thomas J. McHugh, Dmitri A. Rusakov, Ryuichi Shigemoto, *Alexey Semyanov* Retrograde Synaptic Signaling Mediated by K^+ Efflux through Postsynaptic NMDA Receptors / Cell Reports 2013 5:941–951, doi: 10.1016/j.celrep.2013.10.026. (F1000 recommended)

   This is the first evidence that K^+ efflux through postsynaptic NMDA receptors operates as a retrograde signal that increases presynaptic release probability. This finding completely changes the view on the mechanisms of frequency dependent synaptic facilitation.

5. Ilya Partushev, Nikolay Gavrilov, Vadim Turlapov, *Alexey Semyanov* Subcellular Location of Astrocytic Calcium Stores Favors Extrasynaptic Neuron-Astrocyte Communication / Cell Calcium 2013, 54(5): 343–349; doi: 10.1016/j.ceca.2013.08.003.

   This is the first ultrastructural study showing that perisynaptic astrocytic processes are devoid of calcium stores and therefore may not participate in neuron-glia communication mediated by

G-protein coupled receptors. This finding challenges the dogma that GPCR are the main route of communication in tripartite synapse.

6. Inseon Song, Kirill Volynski, Tanja Brenner, Yuri Ushkaryov, Matthew Walker, *Alexey Semyanov* Different Transporter Systems Regulate Extracellular GABA from Vesicular and Non-vesicular Sources / Front Cell Neurosci 2013 7:23. doi: 10.3389/fncel.2013.00023

   This is the first demonstration that different sources of ambient GABA are regulated by different transporter types. This finding opens a possibility for selective pharmacological targeting of synaptic and extrasynaptic GABAergic signalling.

7. Mika Tanaka, Pei-Yu Shih, Hiroshi Gomi, Takamasa Yoshida, Junichi Nakai, Reiko Ando, Teiichi Furuichi, Katsuhiko Mikoshiba, *Alexey Semyanov**, Shigeyoshi Itohara* (*corresponding authors) Astrocytic Ca^{2+} signals are required for the functional integrity of tripartite synapses / Molecular Brain 2013, 6:6 doi: 10.1186/1756-6606-6-6.

   This is the first demonstration that calcium activity in astrocytes determines the coverage of synapses by astrocytic processes and thus efficiency of glutamate spillover. This finding completely changed the view on the principles on neuron-astrocyte interaction.

8. Wu Y-W, Grebenyuk S, McHugh TJ, Rusakov DA, *Semyanov A.* Backpropagating action potentials enable detection of extrasynaptic glutamate by NMDA receptors / Cell Reports 2012, V.1, pp. 495-505, doi:10.1016/j.celrep.2012.03.007

   This is the first demonstration of activity-dependent detection of extrasynaptic glutamate concentration by extrasynaptic NMDA receptors that trigger neuronal plasticity. This finding suggests applicability of Hebb's rule to extrasynaptic signalling and plasticity.

9. Song I, Savtchenko L, *Semyanov A.* Tonic excitation or inhibition is set by GABA(A) conductance in hippocampal interneurons. Nature Commun. 2011 Jul 5;2:376. doi: 0.1038/ncomms1377 (F1000 recommended)

   This is the first demonstration that depolarising GABA can be both excitatory and inhibitory depending on the magnitude of tonic $GABA_A$ conductance. This finding challenged the notion that only reversal potential of ions determines excitatory or inhibitory action of neurotransmitter.

10. *Semyanov A.*, Walker M.C., Kullmann D.M. and Silver R.A. Tonically active $GABA_A$ receptors: modulating gain and maintaining the tone / Trends in Neurosciences 2004 V. 27(5) P262-269

    In this review, I summarised my view on the role of tonic $GABA_A$ current in neuronal and network computations which was in striking contrast to the general notion that tonic current nonspecifically inhibits neuronal populations. This is currently my most cited paper (over 430 citations in WoS).

DETAILS OF PUBLICATION RECORD

List of main research papers in peer reviewed journals

1. Jennings A, Tyurikova O, Bard L, Zheng K, Semyanov A, Henneberger C, Rusakov DA. Dopamine elevates and lowers astroglial Ca2+ through distinct pathways depending on local synaptic circuitry. Glia. 2017 Mar;65(3):447-459. doi: 10.1002/glia.23103.
2. Maria V Vedunova, Tatiana A Mishchenko, Elena V Mitroshina, Natalia V Ponomareva, Andrei V Yudintsev, Alla N Generalova, Sergey M Deyev, Irina V Mukhina, Alexey V Semyanov, Andrei V Zvyagin Cytotoxic effects of upconversion nanoparticles in primary hippocampal cultures. RSC Adv., 2016,6, 33656-33665 doi: 10.1039/C6RA01272H
3. Mironov VI, *Semyanov AV*, Kazantsev VB. Dendrite and Axon Specific Geometrical Transformation in Neurite Development. Front Comput Neurosci. 2016 Jan 28;9:156. doi: 10.3389/fncom.2015.00156. eCollection 2015.
4. DA Adamchik, VV Matrosov, AV Semyanov, VB Kazantsev Model of self-oscillations in a neuron generator under the action of an active medium. JETP Letters 2015, 102 (9), 624-627 doi:10.1134/S0021364015210031
5. Aram Danielyan, Yu-Wei Wu, Pei-Yu Shih, Yulia Dembitskaya, Alessandro Foi, *Alexey Semyanov* Denoising of two-photon fluorescence images with Block-Matching 3D Filtering / Methods 2014 Mar 20. pii: S1046-2023(14)00103-0. doi: 10.1016/j.ymeth.2014.03.010
6. Yu-Wei Wu, Xiaofang Tang, Misa Arizono, Hiroko Bannai, Pei-Yu Shih, Yulia Dembitskaya, Victor Kazantsev, Mika Tanaka, Shigeyoshi Itohara, Katsuhiko Mikoshiba, *Alexey Semyanov* Spatiotemporal Calcium Dynamics in Single Astrocytes and Its Modulation by Neuronal Activity/ Cell Calcium 2014, 55:119–129 doi:10.1016/j.ceca.2013.12.006
7. Ivan Pavlov, Leonid P. Savtchenko, Inseon Song, Jaeyeon Koo, Alexey Pimashkin, Dmitri A. Rusakov, *Alexey Semyanov* Tonic $GABA_A$ Conductance Bidirectionally Controls Interneuron Firing Pattern and Synchronization in the CA3 Hippocampal Network / Proc Natl Acad Sci U S A. 2014 Jan 7;111(1):504-9. doi:10.1073/pnas.1308388110
8. Wlodarczyk AI, Xu C, Song I, Doronin M, Wu Y, Walker M, *Semyanov A* Tonic $GABA_A$ conductance decreases membrane time constant and increases EPSP-spike precision in hippocampal pyramidal neurons / Front Neural Circuits 2013 7:205. doi:10.3389/fncir.2013.00205
9. Pei-Yu Shih, Leonid P. Savtchenko, Naomi Kamasawa, Yulia Dembitskaya, Thomas J. McHugh, Dmitri A. Rusakov, Ryuichi Shigemoto, *Alexey Semyanov* Retrograde Synaptic Signaling Mediated by K^+ Efflux through Postsynaptic NMDA Receptors / Cell Reports 2013 5:941–951, doi: 10.1016/j.celrep.2013.10.026.
10. Ilya Partushev, Nikolay Gavrilov, Vadim Turlapov, *Alexey Semyanov* Subcellular Location of Astrocytic Calcium Stores Favors Extrasynaptic Neuron-Astrocyte Communication / Cell Calcium 2013, 54(5): 343–349; doi: 10.1016/j.ceca.2013.08.003.
11. Afzalov R, Pryazhnikov E, Shih P-Y, Kondratskaya E, Zobova S, Leino S, Salminen O, Khiroug L and *Semyanov A* Low micromolar Ba^{2+} potentiates glutamate transporter current in hippocampal astrocytes. / Front. Cell. Neurosci. 2013 7:135. doi: 10.3389/fncel. 2013.00135
12. Inseon Song, Kirill Volynski, Tanja Brenner, Yuri Ushkaryov, Matthew Walker, *Alexey Semyanov* Different Transporter Systems Regulate Extracellular GABA from Vesicular and Non-vesicular Sources / Front Cell Neurosci 2013 7:23. doi: 10.3389/fncel.2013.00023
13. Agnieszka Wlodarczyk, Sergiy Sylantyev, Murray Herd, Flavie Kersant, Jeremy Lambert, Dmitri Rusakov, Astrid Linthorst, *Alexey Semyanov*, Delia Belelli, Ivan Pavlov, and Matthew

Walker GABA-independent $GABA_A$ Receptor Openings Maintain Tonic Currents / J. Neuroscience 2013, 33(9): 3905-3914; doi: 10.1523/JNEUROSCI.4193-12.2013

14. Kersanté F, Rowley SCS., Pavlov I, Gutièrrez-Mecinas M, *Semyanov A*, Reul JMHM, Walker MC, Linthorst ACE A functional role for both GABA transporter-1 and GABA transporter-3 in the modulation of extracellular GABA and GABAergic tonic conductances in the rat hippocampus / J Physiol 2013; doi: 10.1113/jphysiol.2012.246298
15. Mika Tanaka, Pei-Yu Shih, Hiroshi Gomi, Takamasa Yoshida, Junichi Nakai, Reiko Ando, Teiichi Furuichi, Katsuhiko Mikoshiba, *Alexey Semyanov**, Shigeyoshi Itohara* (*corresponding authors) Astrocytic Ca^{2+} signals are required for the functional integrity of tripartite synapses / Molecular Brain 2013, 6:6 doi: 10.1186/1756-6606-6-6.
16. Gordleeva S, Stasenko S, *Semyanov A*, Dityatev A, Kazantsev V Bi-directional astrocytic regulation of neuronal activity within a network / Front Comput Neurosci 2012, V.6, doi:10.3389/fncom.2012.00092
17. Wu Y-W, Grebenyuk S, McHugh TJ, Rusakov DA, *Semyanov A.* Backpropagating action potentials enable detection of extrasynaptic glutamate by NMDA receptors / Cell Reports 2012, V.1, pp. 495-505, doi:10.1016/j.celrep.2012.03.007
18. Song I, Savtchenko L, *Semyanov A*. Tonic excitation or inhibition is set by GABA(A) conductance in hippocampal interneurons. Nature Commun. 2011 Jul 5;2:376. doi: 0.1038/ncomms1377
19. Kochubey S, *Semyanov A*, Savtchenko L. Network with shunting synapses as a non-linear frequency modulator. Neural Netw. 2011 Jun;24(5):407-16. Epub 2011 Mar 11.
20. Rama S, Vetrivel L, *Semyanov A.* Second-harmonic generation voltage imaging at subcellular resolution in rat hippocampal slices. J Biophotonics. 2010 V.3(12) P784-90
21. Tyukin I, Steur E, Nijmeijer H, Fairhurst D, Song I, *Semyanov A*, Van Leeuwen C. State and parameter estimation for canonic models of neural oscillators. Int J Neural Syst. 2010 V.20(3) P193-207.
22. Kochlamazashvili G, Senkov O, Grebenyuk S, Robinson C, Xiao MF, Stummeyer K, Gerardy-Schahn R, Engel AK, Feig L, *Semyanov A*, Suppiramaniam V, Schachner M, Dityatev A. Neural cell adhesion molecule-associated polysialic acid regulates synaptic plasticity and learning by restraining the signaling through GluN2B-containing NMDA receptors. J Neurosci. 2010 V.30(11) P4171-83.
23. Pavlov I, Savtchenko L, Kullmann DK, *Semyanov A*, Walker MC Outwardly rectifying tonically active $GABA_A$ receptors in pyramidal cells modulate neuronal offset, not gain / J.Neurosci. 2009, 29(48):15341-15350
24. Wanaverbecq N, *Semyanov A*, Pavlov I, Walker MC and Kullmann DM Cholinergic Axons Modulate GABAergic Signaling among Hippocampal Interneurons via Postsynaptic $\alpha 7$ Nicotinic Receptors / J.Neurosci. 2007 V.27(21) P5683–5693
25. Scimemi A, *Semyanov A*, Sperk G, Kullmann DM, Walker MC Multiple and plastic receptors mediate tonic $GABA_A$ receptor currents in the hippocampus / J.Neurosci. 2005 V.25(43) P10016-10024.
26. *Semyanov A.*, Walker M.C., Kullmann D.M. GABA uptake regulates cortical excitability via cell type-specific tonic inhibition / Nature Neurosci 2003 V.6(5) P.484-490
27. *Semyanov A.*, Kullmann D.M. Reduced picrotoxin sensitivity distinguishes ionotropic GABA receptors in hippocampal interneurons/ Neuropharmacology 2002 V.43 P.726-736

28. Kullmann D.M., *Semyanov A.* Glutamatergic modulation of GABAergic signalling among hippocampal interneurons: novel mechanisms regulating hippocampal excitability / Epilepsia 2002 V.43 Suppl.5 P.174-178.
29. *Semyanov A.,* Kullmann D.M. Kainate receptor-dependent axonal depolarisation and action potential initiation in hippocampal interneurons / Nature Neurosci 2001 V. 4(7) P718-723
30. *Semyanov A.,* Godukhin O., Epileptiform activity and EPSP-spike potentiation induced in rat hippocampal CA1 slices by repeated high-K^+: involvement of ionotropic glutamate receptors and Ca^{2+}/calmodulin- dependent protein kinase II / Neuropharm. 2001 V.40(2) P203-211
31. *Semyanov A.,* Kullmann D.M. Modulation of GABAergic signaling among interneurons by metabotropic glutamate receptors / Neuron 2000 V. 25(3) P663-672
32. *Semyanov A.,* Morenkov E., Savin A., Godukhin O. In vivo hippocampal kindling occludes the development of in vitro kindling-like state in CA1 rat hippocampal slices / Epilepsy Res. 2000 V. 38 (1) P75-85
33. *Semyanov A.,* Morenkov E. and Godukhin O. The decreased susceptibility to the development of in vitro kindling-like state in hippocampal CA1 slices of rats sensitive to audiogenic seizures/ Neuroscience Letters 1997, V.230 P.187-190.
34. *Semyanov A.,* Godukhin O. Kindling-like state in rat hippocampal CA1 slices induced by the repeated short-term extracellular K^+ increases: the role of L-type Ca^{2+}- channels / Neuroscience Letters. 1997, V.223 P.177-180

List of Review articles

1. *Alexey Semyanov*, Alexei Verkhratsky Ionic Signalling in Neuronal-Astroglial Interactions/ Opera Medica et Physiologica 2016 Issue 2, pages 74-84; doi: 10.20388/OMP2016.002.0030
2. *Semyanov A* Can diffuse extrasynaptic signaling form a guiding template? Neurochem Int. 2008 V.52(1-2) P31-33
3. Kullmann DM, Ruiz A, Rusakov DM, Scott R, *Semyanov A.*, Walker MC. Presynaptic, extrasynaptic and axonal GABA(A) receptors in the CNS: where and why? / Prog Biophys Mol Biol. 2005 V.87(1) P33-46.
4. *Semyanov A.,* Walker M.C., Kullmann D.M. and Silver R.A. Tonically active $GABA_A$ receptors: modulating gain and maintaining the tone / Trends in Neurosciences 2004 V. 27(5) P262-269
5. *Semyanov A.* Cell type specificity of $GABA_A$ receptor mediated signaling in the hippocampus Current Drug Targets - CNS & Neurological Disorders 2003 V.2(4) P241-249

List of book chapters

1. Walker MC and *Semyanov A* Regulation of Excitability by Extrasynaptic GABA(A) Receptors/ Inhibitory Regulation of Excitatory Neurotransmission Series: Results and Problems in Cell Differentiation, Darlison, Mark G. (Ed.)2007, Approx. 220 p., 24 illus., Hardcover ISBN: 978-3-540-72601-2 (chapter) Results Probl Cell Differ. 2008 V.44 P29-48.