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Адрес

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Контакты

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Образование

1996–1998	Пушино	ПущГУ	нейробиолог
1991–1996	Нижний Новгород	ННГУ	биофизик

Работа в ИБХ

	Заведующий отделом
2018–наст.вр.	Главный научный сотрудник
2021–наст.вр.	Заместитель директора по науке
2018–2022	Заведующий лабораторией

Членство в советах и комиссиях ИБХ

Ученый совет
Аттестационная комиссия

Членство в сообществах

С 2019 – действительный член Европейской Академии;
С 2017 – член ученого совета Института биоорганической химии;
С 2016 – член-корреспондент Российской Академии Наук;
С 2016 – член диссертационного совета по физиологии/ биофизике (Д 212.166.21)
2014 – 2018 – член ученого совета Нижегородского государственного университета.

Участие в научных обществах

С 2017 – действительный член Физиологического Общества Великобритании;
С 2006 – член Общества Нейронаук, Япония;
С 2003 – член Общества изучения мозга, Финляндия;
С 2002 – 2017 – член Физиологического общества Великобритании;
1999 – 2002 – аффилированный член Физиологического общества Великобритании;
С 1999 – член Общества Нейронаук, США (ID# 100006439).

Степени и звания

2016	Член-корреспондент РАН
	Профессор
2002	Доктор наук (Биологические науки)

Гранты и проекты

- 2021–2022 [ГФЕН: Влияние диеты с высоким содержанием жиров и сахаров на нейрон-глиальные взаимодействия в мозге](#)
- 2020–2022 [Влияние сокращения потребляемых калорий на нейрон-глиальные взаимодействия при старении и в модели болезни Альцгеймера](#)
- 2019–2019 [Международная научная конференция «Baikal Neuroscience Meeting 2019»](#)
- 2017–2021 [Физиологические изменения в астроцитах при синаптической пластичности и патологических процессах в мозге](#)
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Публикации

1. Kotova DA, Ivanova AD, Pochechuev MS, Kelmanson IV, Khranova YV, Tiaglik A, Sudoplatov MA, Trifonova AP, Fedotova A, Morozova K, Katrukha VA, Sergeeva AD, Raevskii RI, Pestriakova MP, Solotnikov MA, Stepanov EA, Tsopina AS, Moshchenko AA, Shestopalova M, Zalygin A, Fedotov IV, Fedotov AB, Oleinikov V, Belousov VV, **Semyanov A**, Brazhe N, Zheltikov AM, Bilan DS (2023). Hyperglycemia exacerbates ischemic stroke not through increased generation of hydrogen peroxide. *J Free Radic Biol Med* 208, 153–164, [10.1016/j.freeradbiomed.2023.08.004](#)
2. Barshutina M, Doroshina N, Baizhumanov A, Nikelshparg E, Fedotova A, Popov A, **Semyanov A**, Yakubovsky D, Tselikov G, Luneva O, Kirilyuk I, Maksimov G, Volkov V, Arsenin A, Brazhe N, Novikov S (2023). SERS substrates based on rose petal replicas for the oxidative stress detection. *Appl Surf Sci* 626, , [10.1016/j.apsusc.2023.157281](#)
3. Verkhatsky A, **Semyanov A** (2023). Decline of astrocyte Ca²⁺ signalling in Alzheimer's disease: STIM1 to the rescue! *Cell Calcium* 113, 102756, [10.1016/j.ceca.2023.102756](#)
4. Lin SS, Zhou B, Chen BJ, Jiang RT, Li B, Illes P, **Semyanov A**, Tang Y, Verkhatsky A (2023). Electroacupuncture prevents astrocyte atrophy to alleviate depression. *Cell Death Dis* 14 (5), 343, [10.1038/s41419-023-05839-4](#)
5. Fedotova A, Brazhe A, Doronin M, Toptunov D, Pryazhnikov E, Khiroug L, Verkhatsky A, **Semyanov A** (2023). Dissociation Between Neuronal and Astrocytic Calcium Activity in Response to Locomotion in Mice. *Function* 4 (4), zqad019, [10.1093/function/zqad019](#)
6. (книга) Verkhatsky A, **Semyanov A** (2023). Astrocytes in Ageing. *Subcell Biochem* 103, 253–277, [10.1007/978-3-031-26576-1_11](#)
7. Xiong XY, **Semyanov A**, Tang Y (2022). Restored oligodendrogenesis by fibroblast growth factor 17: molecular mechanism for rejuvenating ageing-related memory deficit. *Signal Transduct Target Ther* 7 (1), 237, [10.1038/s41392-022-01092-x](#)
8. Postnikova TY, Trofimova AM, Zakharova MV, Nosova OI, Brazhe AR, Korzhevskii DE, **Semyanov AV**, Zaitsev AV (2022). Delayed Impairment of Hippocampal Synaptic Plasticity after Pentylentetrazole-Induced Seizures in Young Rats. *Int J Mol Sci* 23 (21), , [10.3390/ijms232113461](#)
9. Popov A, Brazhe N, Fedotova A, Tiaglik A, Bychkov M, Morozova K, Brazhe A, Aronov D, Lyukmanova E, Lazareva N, Li L, Ponimaskin E, Verkhatsky A, **Semyanov A** (2022). A high-fat diet changes astrocytic metabolism to promote synaptic plasticity and behavior. *Acta Physiol (Oxf)* 236 (1), e13847, [10.1111/apha.13847](#)
10. Verkhatsky A, **Semyanov A** (2022). The great astroglial metabolic revolution: Mitochondria fuel astrocyte homeostatic support and neuroprotection. *Cell Calcium* 104, 102583, [10.1016/j.ceca.2022.102583](#)
11. Verkhatsky A, Lazareva N, **Semyanov A** (2022). Glial decline and loss of homeostatic support rather than inflammation defines cognitive aging. *Neural Regen Res* 17 (3), 565–566, [10.4103/1673-5374.320979](#)
12. Tyurikova O, Shih PY, Dembitskaya Y, Savtchenko LP, McHugh TJ, Rusakov DA, **Semyanov A** (2022). K⁺ efflux through postsynaptic NMDA receptors suppresses local astrocytic glutamate uptake. *Glia* 70 (5), 961–974, [10.1002/glia.24150](#)

13. **Semyanov A**, Verkhatsky A (2022). Inclusive Brain: From Neuronal Doctrine to the Active Milieu. *Function* 3 (2), zqab069, [10.1093/function/zqab069](https://doi.org/10.1093/function/zqab069)
14. **Semyanov A**, Verkhatsky A (2021). Astrocytic processes: from tripartite synapses to the active milieu. *Trends Neurosci* 44 (10), 781–792, [10.1016/j.tins.2021.07.006](https://doi.org/10.1016/j.tins.2021.07.006)
15. Fedotova AA, Tiaglik AB, **Semyanov AV** (2021). Effect of Diet as a Factor of Exposome on Brain Function. *J Evol Biochem Physiol* (57), 577–604, [10.1134/S0022093021030108](https://doi.org/10.1134/S0022093021030108)
16. Wang T, Ulrich H, **Semyanov A**, Illes P, Tang Y (2021). Optical control of purinergic signaling. *Purinergic Signal* 17 (3), 385–392, [10.1007/s11302-021-09799-2](https://doi.org/10.1007/s11302-021-09799-2)
17. Denisov P, Popov A, Brazhe A, Lazareva N, Verkhatsky A, **Semyanov A** (2021). Caloric restriction modifies spatiotemporal calcium dynamics in mouse hippocampal astrocytes. *BIOCHIM BIOPHYS ACTA* 1868 (7), 119034, [10.1016/j.bbamcr.2021.119034](https://doi.org/10.1016/j.bbamcr.2021.119034)
18. Dembitskaya Y, Gavrilov N, Kraev I, Doronin M, Tang Y, Li L, **Semyanov A** (2021). Attenuation of the extracellular matrix increases the number of synapses but suppresses synaptic plasticity through upregulation of SK channels. *Cell Calcium* 96, 102406, [10.1016/j.ceca.2021.102406](https://doi.org/10.1016/j.ceca.2021.102406)
19. Huang Z, Xie N, Illes P, Di Virgilio F, Ulrich H, **Semyanov A**, Verkhatsky A, Sperlagh B, Yu SG, Huang C, Tang Y (2021). From purines to purinergic signalling: molecular functions and human diseases. *Signal Transduct Target Ther* 6 (1), 162, [10.1038/s41392-021-00553-z](https://doi.org/10.1038/s41392-021-00553-z)
20. Cao X, Yin HY, Ulrich H, **Semyanov A**, Tang Y (2021). A Neural Circuit for Gut-Induced Sugar Preference. *Neurosci Bull* 37 (5), 754–756, [10.1007/s12264-021-00692-x](https://doi.org/10.1007/s12264-021-00692-x)
21. (книга) Lim D, **Semyanov A**, Genazzani A, Verkhatsky A (2021). Calcium signaling in neuroglia. *Int Rev Cell Mol Biol* 362, 1–53, [10.1016/bs.ircmb.2021.01.003](https://doi.org/10.1016/bs.ircmb.2021.01.003)
22. Verkhatsky A, Illes P, Tang Y, **Semyanov A** (2021). The anti-inflammatory astrocyte revealed: the role of the microbiome in shaping brain defences. *Signal Transduct Target Ther* 6 (1), 150, [10.1038/s41392-021-00577-5](https://doi.org/10.1038/s41392-021-00577-5)
23. Popov A, Brazhe A, Denisov P, Sutyagina O, Li L, Lazareva N, Verkhatsky A, **Semyanov A** (2021). Astrocyte dystrophy in ageing brain parallels impaired synaptic plasticity. *Aging Cell* 20 (3), e13334, [10.1111/acer.13334](https://doi.org/10.1111/acer.13334)
24. Escartin C, Galea E, Lakatos A, OCallaghan JP, Petzold GC, Serrano-Pozo A, Steinhäuser C, Volterra A, Carmignoto G, Agarwal A, Allen NJ, Araque A, Barbeito L, Barzilai A, Bergles DE, Bonvento G, Butt AM, Chen WT, Cohen-Salmon M, Cunningham C, Deneen B, De Strooper B, Díaz-Castro B, Farina C, Freeman M, Gallo V, Goldman JE, Goldman SA, Götz M, Gutiérrez A, Haydon PG, Heiland DH, Hol EM, Holt MG, Iino M, Kastanenka KV, Kettenmann H, Khakh BS, Koizumi S, Lee CJ, Liddelow SA, MacVicar BA, Magistretti P, Messing A, Mishra A, Molofsky AV, Murai KK, Norris CM, Okada S, Oliet SHR, Oliveira JF, Panatier A, Parpura V, Pekna M, Pekny M, Pellerin L, Perea G, Pérez-Nievas BG, Pfrieder FW, Poskanzer KE, Quintana FJ, Ransohoff RM, Riquelme-Perez M, Robel S, Rose CR, Rothstein JD, Rouach N, Rowitch DH, **Semyanov A**, Sirko S, Sontheimer H, Swanson RA, Vitorica J, Wanner IB, Wood LB, Wu J, Zheng B, Zimmer ER, Zorec R, Sofroniew MV, Verkhatsky A (2021). Reactive astrocyte nomenclature, definitions, and future directions. *Nat Neurosci* 24 (3), 312–325, [10.1038/s41593-020-00783-4](https://doi.org/10.1038/s41593-020-00783-4)
25. Федотова АА, Тяглик АБ, **Семьянов АВ** (2021). Влияние диеты как фактора экспозома на работу головного мозга. *Ross Fiziol Zh Im I M Sechenova* 107 (4-5), 533–567, [10.31857/S0869813921040087](https://doi.org/10.31857/S0869813921040087)
26. McCauley JP, Petroccione MA, DBrant LY, Todd GC, Affinnih N, Wisnoski JJ, Zahid S, Shree S, Sousa AA, De Guzman RM, Migliore R, Brazhe A, Leapman RD, Khmaladze A, **Semyanov A**, Zuloaga DG, Migliore M, Scimemi A (2020). Circadian Modulation of Neurons and Astrocytes Controls Synaptic Plasticity in Hippocampal Area CA1. *Cell Rep* 33 (2), 108255, [10.1016/J.CELREP.2020.108255](https://doi.org/10.1016/J.CELREP.2020.108255)
27. Verkhatsky A, Augusto-Oliveira M, Pivoriūnas A, Popov A, Brazhe A, **Semyanov A** (2020). Astroglial asthenia and loss of function, rather than reactivity, contribute to the ageing of the brain. *Pflugers Arch Gesamte Physiol Menschen Tiere* 473 (5), 753–774, [10.1007/s00424-020-02465-3](https://doi.org/10.1007/s00424-020-02465-3)
28. Verkhatsky A, **Semyanov A**, Zorec R (2020). Physiology of Astroglial Excitability. *Function* 1 (2), zqaa016, [10.1093/function/zqaa016](https://doi.org/10.1093/function/zqaa016)
29. **Semyanov A**, Henneberger C, Agarwal A (2020). Making sense of astrocytic calcium signals — from acquisition to interpretation. *Nat Rev Neurosci* 21 (10), 551–564, [10.1038/s41583-020-0361-8](https://doi.org/10.1038/s41583-020-0361-8)
30. Ren WJ, Ulrich H, **Semyanov A**, Illes P, Tang Y (2020). TASK-3: New Target for Pain-Relief. *Neurosci Bull*

- 36 (8), 951–954, [10.1007/s12264-020-00516-4](https://doi.org/10.1007/s12264-020-00516-4)
31. Tyurikova O, Zheng K, Nicholson E, Timofeeva Y, **Semyanov A**, Volynski K, Rusakov DA (2020). Fluorescence lifetime imaging reveals regulation of presynaptic Ca²⁺ by glutamate uptake and mGluRs, but not somatic voltage in cortical neurons. *J Neurochem* 156 (1), 48–58, [10.1111/jnc.15094](https://doi.org/10.1111/jnc.15094)
 32. Dembitskaya Y, Wu YW, **Semyanov A** (2020). Tonic GABAA conductance favors spike-timing-dependent over theta-burst-induced long-term potentiation in the hippocampus. *J Neurosci* 40 (22), 4266–4276, [10.1523/JNEUROSCI.2118-19.2020](https://doi.org/10.1523/JNEUROSCI.2118-19.2020)
 33. Popov A, Denisov P, Bychkov M, Brazhe A, Lyukmanova E, Shenkarev Z, Lazareva N, Verkhatsky A, **Semyanov A** (2020). Caloric restriction triggers morphofunctional remodeling of astrocytes and enhances synaptic plasticity in the mouse hippocampus. *Cell Death Dis* 11 (3), 208, [10.1038/s41419-020-2406-3](https://doi.org/10.1038/s41419-020-2406-3)
 34. Marina N, Christie IN, Korsak A, Doronin M, Brazhe A, Hosford PS, Wells JA, Sheikhabaei S, Humoud I, Paton JFR, Lythgoe MF, **Semyanov A**, Kasparov S, Gourine AV (2020). Astrocytes monitor cerebral perfusion and control systemic circulation to maintain brain blood flow. *Nat Commun* 11 (1), 131, [10.1038/s41467-019-13956-y](https://doi.org/10.1038/s41467-019-13956-y)
 35. Glaser T, Andrejew R, Oliveira-Giacomelli Á, Ribeiro DE, Bonfim Marques L, Ye Q, Ren WJ, **Semyanov A**, Illes P, Tang Y, Ulrich H (2020). Purinergic Receptors in Basal Ganglia Diseases: Shared Molecular Mechanisms between Huntington's and Parkinson's Disease. *Neurosci Bull* 36 (11), 1299–1314, [10.1007/s12264-020-00582-8](https://doi.org/10.1007/s12264-020-00582-8)
 36. Браже АР, Доронин МС, Попов АВ, Денисов ПА, **Семьянов АВ** (2019). Patterns of Calcium Dynamics in Brain Astrocytic Networks. *Ross Fiziol Zh Im I M Sechenova* 105 (11), 1436–1451, [10.1134/S0869813919110037](https://doi.org/10.1134/S0869813919110037)
 37. Verkhatsky A, Rodrigues JJ, Pivoriunas A, Zorec R, **Semyanov A** (2019). Astroglial atrophy in Alzheimer's disease. *Pflugers Arch Gesamte Physiol Menschen Tiere* 471 (10), 1247–1261, [10.1007/s00424-019-02310-2](https://doi.org/10.1007/s00424-019-02310-2)
 38. Verkhatsky A, **Semyanov A** (2019). Astroglial Ca²⁺ signals trigger pathological behaviour in optogenetic mouse. *Cell Calcium* 82, 102062, [10.1016/j.ceca.2019.102062](https://doi.org/10.1016/j.ceca.2019.102062)
 39. **(конференция)**, Brazhe AR, **Semyanov AV**, Verkhatsky AN, Denisov P (2019). High-fat (Western) diet induces morphofunctional remodeling of astrocytes in mouse hippocampus. 67 (S1), E399–E400, [10.1002/glia.23675](https://doi.org/10.1002/glia.23675)
 40. **Semyanov A** (2019). Spatiotemporal pattern of calcium activity in astrocytic network. *Cell Calcium* 78, 15–25, [10.1016/j.ceca.2018.12.007](https://doi.org/10.1016/j.ceca.2018.12.007)
 41. Wu YW, Gordleeva S, Tang X, Shih PY, Dembitskaya Y, **Semyanov A** (2018). Morphological profile determines the frequency of spontaneous calcium events in astrocytic processes. *Glia* 67 (2), 246–262, [10.1002/glia.23537](https://doi.org/10.1002/glia.23537)
 42. Gavrillov N, Golyagina I, Brazhe A, Scimemi A, Turlapov V, **Semyanov A** (2018). Astrocytic coverage of dendritic spines, dendritic shafts, and axonal boutons in hippocampal neuropil. *Front Cell Neurosci* 12, 248, [10.3389/fncel.2018.00248](https://doi.org/10.3389/fncel.2018.00248)
 43. Plata A, Lebedeva A, Denisov P, Nosova O, Postnikova TY, Pimashkin A, Brazhe A, Zaitsev AV, Rusakov DA, **Semyanov A** (2018). Astrocytic Atrophy Following Status Epilepticus Parallels Reduced Ca²⁺ Activity and Impaired Synaptic Plasticity in the Rat Hippocampus. *Front Mol Neurosci* 11, 215, [10.3389/fnmol.2018.00215](https://doi.org/10.3389/fnmol.2018.00215)
 44. **(конференция)** Kustikova VD, Krivonosov MI, Denisov PA, Zaikin AA, Ivanchenko MV, Meyerov IB, **Semyanov AV** (2018). Time-lapse imaging for calcium activity analysis in astrocytes with automatic video processing. *Opera Med Physiol* 4, 83.
 45. **(конференция)** Kustikova V, Krivonosov M, Pimashkin A, Denisov P, Zaikin A, Ivanchenko M, Meyerov I, **Semyanov A** (2018). CalciumCV: Computer vision software for calcium signaling in astrocytes. *LECT NOTES COMPUT SC* 11179 LNCS (1), 168–179, [10.1007/978-3-030-11027-7_17](https://doi.org/10.1007/978-3-030-11027-7_17)
 46. Lebedeva A, Plata A, Nosova O, Tyurikova O, **Semyanov A** (2018). Activity-dependent changes in transporter and potassium currents in hippocampal astrocytes. *Brain Res Bull* 136, 37–43, [10.1016/j.brainresbull.2017.08.015](https://doi.org/10.1016/j.brainresbull.2017.08.015)
 47. Jennings A, Tyurikova O, Bard L, Zheng K, **Semyanov A**, Henneberger C, Rusakov DA (2017). Dopamine elevates and lowers astroglial Ca²⁺ through distinct pathways depending on local synaptic circuitry. *Glia* 65 (3), 447–459, [10.1002/glia.23103](https://doi.org/10.1002/glia.23103)

48. Vedunova MV, Mishchenko TA, Mitroshina EV, Ponomareva NV, Yuditsev AV, Generalova AN, Deyev SM, Mukhina IV, **Semyanov AV**, Zvyagin AV (2016). Cytotoxic effects of upconversion nanoparticles in primary hippocampal cultures. *RSC Adv* 6 (40), 33656–33665, [10.1039/c6ra01272h](https://doi.org/10.1039/c6ra01272h)
49. Pavlov I, Savtchenko LP, Song I, Koo J, Pimashkin A, Rusakov DA, **Semyanov A** (2014). Tonic GABA_A conductance bidirectionally controls interneuron firing pattern and synchronization in the CA3 hippocampal network. *Proc Natl Acad Sci U S A* 111 (1), 504–509, [10.1073/pnas.1308388110](https://doi.org/10.1073/pnas.1308388110)
50. Wlodarczyk AI, Xu C, Song I, Doronin M, Wu YW, Walker MC, **Semyanov A** (2013). Tonic GABA_A conductance decreases membrane time constant and increases EPSP-spike precision in hippocampal pyramidal neurons. *Front Neural Circuits* 7 (DEC), 205, [10.3389/fncir.2013.00205](https://doi.org/10.3389/fncir.2013.00205)
51. Shih PY, Savtchenko LP, Kamasawa N, Dembitskaya Y, McHugh TJ, Rusakov DA, Shigemoto R, **Semyanov A** (2013). Retrograde Synaptic Signaling Mediated by K⁺ Efflux through Postsynaptic NMDA Receptors. *Cell Rep* 5 (4), 941–951, [10.1016/j.celrep.2013.10.026](https://doi.org/10.1016/j.celrep.2013.10.026)
52. Wlodarczyk AI, Sylantsev S, Herd MB, Kersanté F, Lambert JJ, Rusakov DA, Linthorst ACE, **Semyanov A**, Belelli D, Pavlov I, Walker MC (2013). GABA-independent GABA_A receptor openings maintain tonic currents. *J Neurosci* 33 (9), 3905–3914, [10.1523/JNEUROSCI.4193-12.2013](https://doi.org/10.1523/JNEUROSCI.4193-12.2013)
53. Wu YW, Grebenyuk S, McHugh TJ, Rusakov DA, **Semyanov A** (2012). Backpropagating Action Potentials Enable Detection of Extrasynaptic Glutamate by NMDA Receptors. *Cell Rep* 1 (5), 495–505, [10.1016/j.celrep.2012.03.007](https://doi.org/10.1016/j.celrep.2012.03.007)
54. Song I, Savtchenko L, **Semyanov A** (2011). Tonic excitation or inhibition is set by GABA_A conductance in hippocampal interneurons. *Nat Commun* 2 (1), 376, [10.1038/ncomms1377](https://doi.org/10.1038/ncomms1377)
55. 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 (2010). Neural cell adhesion molecule-associated polysialic acid regulates synaptic plasticity and learning by restraining the signaling through GluN2B-containing NMDA receptors. *J Neurosci* 30 (11), 4171–4183, [10.1523/JNEUROSCI.5806-09.2010](https://doi.org/10.1523/JNEUROSCI.5806-09.2010)
56. Pavlov I, Savtchenko LP, Kullmann DM, **Semyanov A**, Walker MC (2009). Outwardly rectifying tonically active GABA_A receptors in pyramidal cells modulate neuronal offset, not gain. *J Neurosci* 29 (48), 15341–15350, [10.1523/JNEUROSCI.2747-09.2009](https://doi.org/10.1523/JNEUROSCI.2747-09.2009)
57. Wanaverbecq N, **Semyanov A**, Pavlov I, Walker MC, Kullmann DM (2007). Cholinergic axons modulate GABAergic signaling among hippocampal interneurons via postsynaptic $\alpha 7$ nicotinic receptors. *J Neurosci* 27 (21), 5683–5693, [10.1523/JNEUROSCI.1732-07.2007](https://doi.org/10.1523/JNEUROSCI.1732-07.2007)
58. Scimemi A, **Semyanov A**, Sperk G, Kullmann DM, Walker MC (2005). Multiple and plastic receptors mediate tonic GABA_A receptor currents in the hippocampus. *J Neurosci* 25 (43), 10016–10024, [10.1523/JNEUROSCI.2520-05.2005](https://doi.org/10.1523/JNEUROSCI.2520-05.2005)
59. **Semyanov A**, Walker MC, Kullmann DM, Silver RA (2004). Tonic active GABA_A receptors: Modulating gain and maintaining the tone. *Trends Neurosci* 27 (5), 262–269, [10.1016/j.tins.2004.03.005](https://doi.org/10.1016/j.tins.2004.03.005)
60. **Semyanov A**, Walker MC, Kullmann DM (2003). GABA uptake regulates cortical excitability via cell type-specific tonic inhibition. *Nat Neurosci* 6 (5), 484–490, [10.1038/nn1043](https://doi.org/10.1038/nn1043)
61. **Semyanov A**, Kullmann DM (2001). Kainate receptor-dependent axonal depolarization and action potential initiation in interneurons. *Nat Neurosci* 4 (7), 718–723, [10.1038/89506](https://doi.org/10.1038/89506)
62. **Semyanov A**, Kullmann DM (2000). Modulation of GABAergic signaling among interneurons by metabotropic glutamate receptors. *Neuron* 25 (3), 663–672, [10.1016/S0896-6273\(00\)81068-5](https://doi.org/10.1016/S0896-6273(00)81068-5)