

Pavel E. Musienko

MD, PhD, D.Sc

Head of Neuromodulation Lab
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Current positions:

Head of Neuromodulation Lab, Pavlov Institute of Physiology, Russian Academy of Science

Professor, Head of Neuroprosthetics Lab, Institute of Translational Biomedicine, St-Petersburg State University, Russia

Head of Neurorehabilitation technologies Lab, Children's Surgery and Orthopedic Clinic, Department of Non-pulmonary Tuberculosis, Institute of Phthisiopulmonology, St-Petersburg, Russia

Education and training:

Medical Military Academy, St. Petersburg, Russia/Medicine/"Physician (MD)"/2000

Pavlov Institute of Physiology, St. Petersburg, Russia/Physiology/Candidate of Science (PhD)/2006

Pavlov Institute of Physiology, St. Petersburg, Russia/Medicine/Doctor of Science (D.Sc)/2014

Professional appointments:

1. Junior scientist at the Motor physiology laboratory Pavlov Institute of Physiology, Russian Academy of Sciences (2002- 2005)
2. Research Associate at the Motor physiology laboratory Pavlov Institute of Physiology, Russian Academy of Sciences (2005- 2015)
3. Doctor of medical sciences (D.Sc, doctoral dissertation "Spinal-brain stem mechanisms of posture and locomotion integrative control", defended on May 2014)
4. Senior researcher, Motor physiology laboratory, Pavlov Institute of Physiology, Russian Academy of Science (2015-2021). Head of Neuromodulation Lab (2021-present)
5. Professor, Head of Neuroprosthetics Lab, Institute of Translational Biomedicine, Saint-Petersburg State University (2015-present)

Publication activity^[1]_{SEP}:

Peer-reviewed publications – 88

Patents – 9

Citations – 4763

H-index – 28 <https://scholar.google.com/citations?user=MhOceJ0AAAAJ&hl=en>

H-index – 25 <https://www.scopus.com/authid/detail.uri?authorId=8559287000>

Selected peer-reviewed publications:

1. Courtine G, Gerasimenko Y, van den Brand R, Yew A, **Musienko P**, Zhong H, Song B, Ao Y, Ichiyama RM, Lavrov I, Roy RR, Sofroniew MV, Edgerton VR. Transformation of nonfunctional spinal circuits into functional states after the loss of brain input. **Nature Neuroscience**. 2009; 12 (10): 1333-1342.
<http://www.nature.com/neuro/journal/v12/n10/full/nn.2401.html>^[1]_{SEP}
2. van den Brand R., Heutschi J., Barraud Q., DiGiovanna J., Bartholdi K., Huerlimann M., Friedli L., Vollenweider I., Moraud E.M., Duis S., Dominici N., Micera S., **Musienko P.**, Courtine G. Restoring voluntary control of locomotion after paralyzing spinal cord injury. **Science**. 2012. 336(6085):1182-1185.
<http://www.sciencemag.org/content/336/6085/1182>^[1]_{SEP}
3. Dominici N, Keller U, Vallery H, Friedli L, van den Brand R, Starkey ML, **Musienko P**, Riener R, Courtine G. Versatile robotic interface to evaluate, enable and train locomotion and balance after neuromotor disorders. **Nature Medicine**. 2012; 18(7): 1142-1147.
<http://www.nature.com/nm/journal/v18/n7/full/nm.2845.html>
4. Courtine G, van den Brand R, **Musienko P**. Spinal cord injury: time to move. **Lancet**. 2011, 377(9781):1896-8.
[http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(11\)60711-3/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(11)60711-3/abstract)
5. Wenger N, Moraud EM, Raspopovic S, Bonizzato M, DiGiovanna J, **Musienko P**, Morari M, Micera S, Courtine G. Closed-loop neuromodulation of spinal sensorimotor circuits controls refined locomotion after complete spinal cord injury. **Science Transl Med**. 2014; 6(255): 255ra133.
<https://stm.sciencemag.org/content/6/255/255ra133>
6. Minev IR*, **Musienko P.*** et al. Electronic dura mater for long-term multimodal neural interfaces. **Science**. 2015; 347(6218):159-163.[* contributed equally].
<http://www.sciencemag.org/content/347/6218/159>
7. Friedli L, Rosenzweig ES, Barraud Q, Schubert M, Dominici N, Awai L, Nielson JL, **Musienko P**, Nout-Lomas Y, Zhong H, Zdunowski S, Roy RR, Strand SC, van den Brand R, Havton LA, Beattie MS, Bresnahan JC, Bézard E, Bloch J, Edgerton VR, Ferguson AR, Curt A, Tuszynski MH, Courtine G. Pronounced species divergence in corticospinal tract reorganization and functional recovery after lateralized spinal cord injury favors primates. **Science Translational Medicine**. 2015; 7(302): 302ra134.

<http://stm.sciencemag.org/content/7/302/302ra134>

8. Wenger N, Moraud EM, Gandar J, **Musienko P.** et al. Spatiotemporal neuromodulation therapies engaging muscle synergies improve motor control after spinal cord injury. **Nature Medicine.** 2016; 22 (2):138-145.

<http://www.nature.com/nm/journal/v22/n2/full/nm.4025.html>

9. Capogrosso M, Wagner FB, Gandar J, Moraud EM, Wenger N, Milekovic T, Shkorbatova P, Pavlova N, **Musienko P**, Bezard E, Bloch J, Courtine G. Configuration of electrical spinal cord stimulation through real-time processing of gait kinematics. **Nature Protocols.** 2018; 13: 2031-2061.

<https://www.nature.com/articles/s41596-018-0030-9>

10. Afanasenkau D, Kalinina D, Lyakhovetskii V, Tondera C, Gorsky O, Moosavi S, Pavlova N, Merkulyeva N, Kalueff A, Minev I, **Musienko P.** Rapid prototyping of soft bioelectronic implants for use as neuromuscular interfaces. **Nature Biomed Eng.** 2020; 4:1010–1022.

<https://www.nature.com/articles/s41551-020-00615-7>

Selected Patents:

Vörös J, Larmagnac A, Courtine G, **Musienko P** “PDMS-Based Stretchable Multi-Electrode and Chemotrode Array for Epidural and Subdural Neuronal Recording, Electrical Stimulation and Drug Delivery”. Publication Date 22.12.2011. **U.S. Patent** №20130303873.

Courtine G., **Musienko P.**, Barroud Q. “Pharmacological stimulation to facilitate and restore standing and walking functions in spinal cord disorders”. Publication Date 7.01.2015. **E.U. Patent** №20130174477.

Minev I.R., Hirsch A, **Musienko P**, Courtine G, Lacour S.P. “Synthetic skin for recording and modulating physiological activities“. Publication Date 14.07.2016. **E.U. Patent** №2016110564.

Research grants principal investigator (PI) experience:

- PI in Russian foundation of basic research (RFBR) grant 08-04-00688-A, Project title: «Postural control mechanisms in decerebrated and spinalized animals» (2008-2010)
- PI in Russian foundation of basic research (RFBR) grant 11-04-01669-A, Project title: «Spinal and brain stem mechanisms of posture and locomotion integrative control» (2010-2012)
- PI in Russian foundation of basic research (RFBR) grant 12-04-33145-MOL-A-VED, Project title: «Investigation of spinal neuronal mechanisms of postural and locomotor control» (2012-2013)
- PI in Grant of the President of the Russian Federation MK-5684.2012.4, Project title: «Investigation of bioengineering approaches to restore spinal cord functions» (2012-2013)
- PI in Russian science foundation (RSF) grant 14-15-00788, Project title: «Spinal and supraspinal mechanisms of the somatosensory control of locomotor movement directions in animals and humans.» (2014-2016)

- PI in Grant of President of Russian Federation (MD-1018.2017.7), Project title: «Electrochemical neuromodulation in the treatment of patients with spinal cord injury» (2017-2018)
- PI in Russian foundation for basic research grant (RFBR)17-29-01034-OFI-M, Project title: «Spinal mechanisms of skeletal muscle neuroregulation in condition of modeled microgravity» (2017-2019)
- PI in Russian foundation for basic research grant (RFBR)17-04-01822-A, Project title: «Spinal mechanisms of somatovisceral integration of bladder and locomotor activity» (2017-2019)
- co-PI in Grant of German Research Foundation (DFG) for International Collaboration, Project title: «Soft Bioelectronic Implants for Exploring Neural Activity in the Spinal Cord» (2018- 2019)
- co-PI in Grant of National Institutes of Health (NIH) R01 NS100928-01A1, Project title: «Neural mechanisms of locomotion evoked by epidural stimulation of the spinal cord» (2017-2022)
- PI in Russian foundation for basic research grant (RFBR) 20-015-00568-A, Project title: «Investigation of the neuronal mechanisms of somatosensory stimulation effects to low urinary tract system» (2020-2022)
- PI in Russian science foundation (RSF) grant 22-15-00092, Project title: «Investigation of the mechanisms of the parkinsonism development and the new treatment approaches based on multisystem neurorehabilitation» (2022-2024)

Research interests

- Spinal and brainstem mechanisms of the postural and locomotor control
- The role of serotonin, noradrenaline, dopamine, trace amine and other neuropharmacological systems in regulation of sensorimotor behaviors
- Structural and functional organization of the spinal neuronal networks responsible for sensorimotor and somatovisceral integration
- Pathophysiology of spinal cord injuries (SCI)
- Mechanisms of the Parkinson's disease development
- Spinal cord stimulation, Functional Electrical Stimulation
- Neurorehabilitation interventions to restore the motor and visceral functions after neurological impairments
- Cortico-spinal neuroprostheses

The main peer reviewed publications:

1. Mirzoev TM, Tyganov SA, Lomonosova YN, **Musienko PE**, Shenkman BS. Signaling pathways regulating protein synthesis in rat soleus muscle during early stages of hindlimb unloading. **Russ Fiziol Zh Im I M Sechenova**. 2015;101(11):1299-308.
2. Lyakhovetskii V. A., Merkulyeva N. S., Veshchitskii A. A., Gerasimenko Y. P., and **Musienko P. E.** A mathematical model of hind-limb control in cats when walking backward. **Biophysics**. 2016; 61(5): 797–804.

3. Merkulyeva N.S., Veshchitskiy A.A., Shkorbatova P.Yu., Shenkman B.S., **Musienko P.E.**, Makarov F.N. Morphometric properties of dorsal Clarke's nuclei in rostral segments of lumbar portion of spinal cord in cat. **Morfologia**. 2016; 149(5): 797–804.
4. Wenger N., Moraud E.M., Gandar J., **Musienko P.** et al. Spatiotemporal neuromodulation therapies engaging muscle synergies improve motor control after spinal cord injury. **Nature Medicine**. 2016; 22(2):138–145.
5. Merkulyeva N., Veshchitskii A., Makarov F., Gerasimenko Y, **Musienko P.** Distribution of 28 kDa calbindin-immunopositive neurons in the cat spinal cord. **Frontier in Neuroanatomy**. 2016; 28(9):166.
6. Minev I.R., Hirsch A, **Musienko P**, Courtine G, Lacour S.P. "Synthetic skin for recording and modulating physiological activities". Publication Date 14.07.2016. **E.U. Patent** №2016110564
7. Minev I.R.*, **Musienko P.*** et al. Electronic dura mater for long-term multimodal neural interfaces. **Science**. 2015. 347(6218):159–163. [* contributed equally]
8. Friedli L, Rosenzweig ES, Barraud Q, Schubert M, Dominici N, Awai L, Nielson JL, **Musienko P**, Nout-Lomas Y, Zhong H, Zdunowski S, Roy RR, Strand SC, van den Brand R, Havton LA, Beattie MS, Bresnahan JC, Bézard E, Bloch J, Edgerton VR, Ferguson AR, Curt A, Tuszynski MH, Courtine G. Pronounced species divergence in corticospinal tract reorganization and functional recovery after lateralized spinal cord injury favors primates. **Sci Transl Med**. 2015; 7(302): 302ra134.
9. Lyakhovetskii VA, Gorskii OV, Gerasimenko YP, **Musienko PE**. Mathematical model of the hindlimbs control during cat locomotion with balance. *Ross Fiziol Zh Im I M Sechenova*. 2015; 101(2): 200–13. Russian.
10. Lavrov I, **Musienko PE**, Selionov VA, Zdunowski S, Roy RR, Reggie Edgerton V, Gerasimenko Y. **Brain Res**. 2015;1600:84–92.
11. Lyakhovetskii V, Gorskii O, Gerasimenko Y, **Musienko P**. Mathematical model of the hindlimbs control during cat locomotion with balance. *Ross Fiziol Zh Im I M Sechenova*. 2015; 101(2): 200–213.
12. Courtine G., **Musienko P.**, Barraud Q. "Pharmacological stimulation to facilitate and restore standing and walking functions in spinal cord disorders". Publication Date 7.01.2015. **E.U. Patent** №20130174477.
13. **Musienko P.E.**, Deliagina T.G., Gerasimenko Y.P., Orlovsky G.N., Zelenin P.V. Limb and trunk mechanisms for balance control during locomotion in quadrupeds. **J Neurosci**. 2014. 34(16): 5704–16.
14. Borton D., Bonizzato M., Beauparlant J., Digiovanna J., Moraud E.M., Wenger N., **Musienko P.**, Minev I.R., Lacour S.P., Millán J.D., Micera S., Courtine G. Corticospinal neuroprostheses to restore locomotion after spinal cord injury // **Neuroscience Research**. 2014; 78: 21–29. Review.
15. Wenger N, Moraud EM, Raspopovic S, Bonizzato M, DiGiovanna J, **Musienko P**, Morari M, Micera S, Courtine G. Closed-loop neuromodulation of spinal sensorimotor circuits controls refined locomotion after complete spinal cord injury. **Science Transl Med**. 2014; 6(255): 255ra133.
16. Capogrosso M., Wenger N., Raspopovic S., **Musienko P.**, Beauparlant J., Bassi Luciani L., Courtine G., Micera S. A computational model for epidural electrical stimulation of spinal sensorimotor circuits. **The Journal of Neuroscience**. 2013; 33(49):19326–19340.
17. Beauparlant J., van den Brand R., Barraud Q., Friedli L., **Musienko P.**, Dietz V., Courtine G. Undirected compensatory plasticity contributes to neuronal dysfunction after severe spinal cord injury. **Brain**. 2013; 136(11): 3347–3361.
18. **Musienko P.E.**, Bogacheva I.N., Savochin A.A., Kilimnik V.A., Gorsky O.V., Nikitin O.A., Gerasimenko Y.P. Non-invasive transcutaneous spinal cord stimulation facilitates locomotor activity in decerebrated and spinal cats. *Ross Fiziol Zh Im I M Sechenova*. 2013. 99(8): 917–927. Russian.
19. **Musienko P.E.**, Gorskiĭ O.V., Kilimnik V.A., Kozlovskaya I.B., Courtine G., Edgerton V.R., Gerasimenko Iu.P. Neuronal control of posture and locomotion in decerebrated and spinalized animals. *Ross Fiziol Zh Im I M Sechenova*. 2013. 99(3): 392–405. Russian.
20. Moraud EM, Wenger N, Gandar J, DiGiovanna J, **Musienko P**, Courtine G, Micera S. A real-time

- platform for studying the modulatory capacity of epidural stimulation after spinal cord injury. **Neural Engineering**. 2013. 6th International Ieee/Embs Conference On Neural Engineering (Ner) (ISSN: 1948-3546): 1449-1452.
21. **Musienko P.E.**, Zelenin P.V., Lyalka V.F., Gerasimenko Y.P., Orlovsky G. N., & Deliagina T.G. Spinal and supraspinal control of the direction of stepping during locomotion . **J Neurosci**. 2012. 32(48):17442-17453.
 22. van den Brand R, Heutschi J, Barraud Q, DiGiovanna J, Bartholdi K, Huerlimann M, Friedli L, Vollenweider I, Moraud EM, Duis S, Dominici N, Micera S, **Musienko P**, Courtine G. Restoring voluntary control of locomotion after paralyzing spinal cord injury. **Science**. 2012; 336(6085):1182-5.
 23. Dominici N, Keller U, Vallery H, Friedli L, van den Brand R, Starkey ML, **Musienko P**, Riener R, Courtine G. Versatile robotic interface to evaluate, enable and train locomotion and balance after neuromotor disorders. **Nat Med**. 2012. 18(7):1142-1147.
 24. **Musienko P**, Courtine G, Tibbs JE, Kilimnik V, Savochin A, Garfinkel A, Roy RR, Edgerton VR, Gerasimenko Y. Somatosensory control of balance during locomotion in decerebrated cat. **J Neurophysiol**. 2012;107(8):2072-82.
 25. **Musienko P**, Heutschi J, Friedli L, den Brand RV, Courtine G. Multi-system neurorehabilitative strategies to restore motor functions following severe spinal cord injury. **Exp Neurol**. 2012 May;235(1):100-9.
 26. **Musienko P**, van den Brand R, Märzendorfer O, Roy RR, Gerasimenko Y, Edgerton VR, Courtine G. Controlling specific locomotor behaviors through multidimensional monoaminergic modulation of spinal circuitries. **J Neurosci**. 2011;31(25):9264-78.
 27. Courtine G, van den Brand R, **Musienko P**. Spinal cord injury: time to move. **Lancet**. 2011, 377(9781):1896-8.
 28. Vörös J, Larmagnac A, Courtine G, **Musienko P** “PDMS-Based Stretchable Multi-Electrode and Chemotrode Array for Epidural and Subdural Neuronal Recording, Electrical Stimulation and Drug Delivery”. Publication Date 22.12.2011. **U.S. Patent** №20130303873.
 29. Horst M, Van den Brand R, Heutschi J, **Musienko P**, Gobet R, Sulser S, Courtine, G, Eberli D. Multi-systems neurorehabilitation improves bladder function after spinal cord injury. **The Journal of Urology**. 2011; 185 (4): e171.
 30. **Musienko PE**, Zelenin PV, Orlovsky GN, Deliagina TG. Facilitation of postural limb reflexes with epidural stimulation in spinal rabbits. **Neurophysiol**. 2010, 03(2):1080-92.
 31. Courtine G, Gerasimenko Y, van den Brand R, Yew A, **Musienko P**, Zhong H, Song B, Ao Y, Ichiyama RM, Lavrov I, Roy RR, Sofroniew MV, Edgerton VR. Transformation of nonfunctional spinal circuits into functional states after the loss of brain input. **Nat Neurosci**. 2009;12(10):1333-42.
 32. **Musienko P**, van den Brand R, Maerzendorfer O, Larmagnac A, Courtine G. Combinatory electrical and pharmacological neuroprosthetic interfaces to regain motor function after spinal cord injury. **IEEE Trans Biomed Eng**. 2009;56(11Pt 2):2707-11.
 33. Bogacheva IN, Nikitin OA, **Musienko PE**, Savokhin AA, Gerasimenko IuP. Mechanisms of stepping rhythm formation during epidural spinal cord stimulation in decerebrated and spinal cord transected cats. **Biofizika**. 2009; 54(3):529-36.
 34. Gerasimenko Y, **Musienko P**, Bogacheva I, Moshonkina T, Savochin A, Lavrov I, Roy RR, Edgerton VR. Propriospinal bypass of the serotonergic system that can facilitate stepping. **J Neurosci**. 2009; 29(17):5681-9
 35. **Musienko PE**, Pavlova NV, Selionov VA, Gerasimenko IuP. Locomotion induced by epidural stimulation in decerebrate cat after spinal cord injury. **Biofizika**. 2009; 54(2):293-300.
 36. **Musienko PE**, Zelenin PV, Lyalka VF, Orlovsky GN, Deliagina TG. Postural performance in decerebrated rabbit. **Behav Brain Res**. 2008; 190(1):124-34.
 37. Lyalka VF, **Musienko PE**, Orlovsky GN, Grillner S, and Deliagina TG. Effect of intrathecal

- administration of serotonergic and noradrenergic drugs on postural performance in rabbits with spinal cord lesions. *J Neurophysiol.* 2008; 100(2):723-32.
38. **Musienko PE**, Bogacheva IN, Gerasimenko YP. Significance of peripheral feedback in the generation of stepping movements during epidural stimulation of the spinal cord. *Neurosci. Behav. Physiol.* 2007; 37(2):181-190.
 39. Bogacheva IN, **Musienko PE**, Gerasimenko YP. Mathematical modeling of the mechanisms of locomotor pattern formation under epidural spinal cord stimulation with consideration of peripheral feedback. *Biofizika.* 2005; 50(6):1125-30. Russian.
 40. Gerasimenko Y, Lavrov I, Bogacheva I, Shcherbakova N, Kucher V, **Musienko P**. Formation of locomotor patterns in decerebrate cats in conditions of epidural stimulation of the spinal cord. *Neurosci. Behav. Physiol.* 2005;35(3):291-298.
 41. Sysoev Yu. I., Musienko P.E., Okovityi S.V. Influence of Cholinergic and Adrenergic Agents on the Recovery of Locomotor Functions after CNS Damage. *Experimental and Clinical pharmacology.* 2017. Vol. 80, № 7. pp. 37-48. DOI: <https://doi.org/10.30906/0869-2092-2017-80-7-37-44>
 42. Fomin I., Mikhailov V., Bakhshiev A., Merkulyeva N., Veshchitskii A., **Musienko P**. Detection of Neurons on Images of the Histological Slices Using Convolutional Neural Network. *Advances in Neural Computation, Machine Learning, and Cognitive Research.* NEUROINFORMATICS 2017. Studies in Computational Intelligence, Springer, Cham. 2017. vol 736. pp. 85-90. DOI 10.1007/978-3-319-66604-4_13
 43. Merkulyeva N, Veshchitskii A, Gorsky O, Pavlova N, Zelenin PV, Gerasimenko Y, Deliagina TG, **Musienko P**. Distribution of spinal neuronal networks controlling forward and backward locomotion. *Journal of Neuroscience.* 2018. 38(20):4695-4707. doi: 10.1523/JNEUROSCI.2951-17.2018.
 44. Demin KA, Meshalkina DA, Kysil EV, Antonova KA, Volgin AD, Yakovlev OA, Alekseeva PA, Firuleva MM, Lakstygai AM, de Abreu MS, Barcellos LJG, Bao W, Friend AJ, Amstislavskaya TG, Rosemberg DB, **Musienko PE**, Song C, Kalueff AV. Zebrafish models relevant to studying central opioid and endocannabinoid systems *Progress in Neuro-Psychopharmacology & Biological Psychiatry.* 2018. S0278-5846(18) 0054-X. doi: 10.1016/j.pnpbp.2018.03.024.
 45. Capogrosso M, Gandar J, Greiner N, Moraud EM, Wenger N, Shkorbatova P, **Musienko P**, Minev I, Lacour S, Courtine G. Advantages of soft subdural implants for the delivery of electrochemical neuromodulation therapies to the spinal cord. *Journal of Neural Engineering.* 2018. 15(2):026024. doi: 10.1088/1741-2552/aaa87a.
 46. **П.Е. Мусиенко**, П.В. Зеленин, Г.Н. Орловский, Т.Г. Делягина. Спинально-стволовые механизмы интегративного контроля позы и локомоции. Новосибирск, 2018. **Монография.** (опубликована в 2019). 140 с., ISBN 978-5-6041549-1-5.
 47. **П.Е. Мусиенко**, Г. Куртин. Новые нейрореабилитационные технологии: от эксперимента в клинику. Новосибирск, 2018 **Монография.** (опубликована в 2019). 100 с., ISBN 978-5-6041549-2-2.
 48. Capogrosso M, Wagner FB, Gandar J, Moraud EM, Wenger N, Milekovic T, Shkorbatova P, Pavlova N, **Musienko P**, Bezard E, Bloch JI, Courtine G. Configuration of electrical spinal cord stimulation through real-time processing of gait kinematics. *Nature Protocols.* 2018; 13: 2031-2061. doi: 10.1038/s41596-018-0030-9.
 49. Merkulyeva N, Lyakhovetskii V, Veshchitskii A, Bazhenova E, Gorskii O, **Musienko P**. Activation of the spinal neuronal network responsible for visceral control during locomotion. *Exp Neurol.* 2019; 320:112986. doi: 10.1016/j.expneurol.2019.112986. (WOS, Scopus, РИНЦ, IF 2017/2018=4.483)
 50. Sysoev YI, Meshalkina DA, Petrov DV, Okovityi SV, **Musienko PE**, Kalueff AV. Pharmacological screening of a new alpha-2 adrenergic receptor agonist, mafedine, in zebrafish. *Neurosci Lett.* 2019; 701:234-239. doi: 10.1016/j.neulet.2019.03.001. (WOS, Scopus, РИНЦ, IF 2018/2019=2.173)
 51. Shkorbatova PY, Lyakhovetskii VA, Merkulyeva NS, Veshchitskii AA, Bazhenova EY, Laurens J,

- Pavlova NV, **Musienko PE**. Prediction Algorithm of the Cat Spinal Segments Lengths and Positions in Relation to the Vertebrae. **Anat Rec** (Hoboken). 2019; 302(9):1628-1637. doi: 10.1002/ar.24054. (WOS, Scopus, РИНЦ, IF 2018/2019=1.329)
52. Deliagina TG, **Musienko PE**, Zelenin PV. Nervous mechanisms of locomotion in different directions. **Curr Opin Physiol**. 2019; 8:7-13. doi: 10.1016/j.cophys.2018.11.010. (WOS, Scopus, РИНЦ)
53. Попов А.А., Ляховецкий В.А., Меркульева Н.С., Горский О.В., Баженова Е.Ю., **Мусиенко П.Е.** Кинематика локомоторных движений крыс в течение 7-дневного вывешивания. **Российский физиологический журнал им. И. М. Сеченова**. 2019. Том 105, № 4, с. 447–455. doi:10.1134/S0869813919040095 (РИНЦ; IF=0.617)
54. MN Barshutina, SO Kirichenko, VA Wodolajski, **PE Musienko**. Mechanisms of electrical conductivity in CNT/silicone composites designed for neural interfacing. **Materials Letters**. 2019. 236, 183-186. doi: 10.1016/j.matlet.2018.10.090 (WOS, Scopus, РИНЦ, IF2017/2018=2.687.)
55. Deriabin, K. V., Lobanovskaia, E. K., Kirichenko, S. O., Barshutina, M. N., **Musienko, P. E.** & Islamova, R. M., Synthesis of ferrocenyl-containing silicone rubbers via platinum-catalyzed Si–H self-cross-linking. **Applied Organometallic Chemistry**. 2019, e5300. doi: 10.1002/aoc.5300 (WOS, Scopus, РИНЦ, IF 2017/2018 = 3,581).
56. Espinoza, S., Sukhanov, I., Kozlova, A., Antonova, K. A., Illiano, P., Leo, D., Merkulyeva, N., Kalinina, D., **Musienko, P.**, Rocchi, A., Mus, L., Sotnikova, T. D. & Gainetdinov, R. R. Trace Amine-Associated Receptor 5 Provides Olfactory Input Into Limbic Brain Areas and Modulates Emotional Behaviors and Serotonin Transmission. 2020. **Frontiers in Molecular Neuroscience**. 13: 18 doi: 10.3389/fnmol.2020.00018 (WOS, Scopus, РИНЦ, IF 2017/2018 = 3,720)
57. Sysoev Y, Bazhenova E, Lyakhovetskii V, Kovalev G, Shkorbatova P, Islamova R, Pavlova N, Gorskii O, Merkulyeva N, Shkarupa D, **Musienko P**. Site-specific neuromodulation of detrusor and external urethral sphincter by epidural spinal cord stimulation. **Front. Syst. Neurosci**. 2020; 14:47. doi: 10.3389/fnsys.2020.00047 (Scopus/WoS/РИНЦ, IF=4.0).
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