# Antonina Dolgorukova, M.D.

### Personal details

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#### Education

Graduated from Pavlov First Saint Petersburg State Medical University, Saint Petersburg, Russia with a Diploma in General Medicine: Physician, M.D., 2018

Graduated from Paramedic College, Saint Petersburg, Russia with a Master's degree in emergency medical services: Paramedic, 2008

#### Experience in computational methods

#### **Research projects:**

- CayleyPy: developing efficient artificial intelligence-based approaches to pathfinding on extremely large graphs.
- <u>Research Project 01 Around Multimodal Single-Cell</u>: Analysis of multimodal single-cell data from the NeurIPS 2021 competition using clustering (UMAP, tSNE, PCA), gene enrichment, and feature importance analysis to characterize cellular states and functions, explore correlation patterns between protein and RNA modalities, and uncover common regulatory signals across the transcriptome and proteome.

#### Kaggle competitions:

- NeurIPS 2024 Predict New Medicines with BELKA (13th place of 1950 teams)
- CAFA 5 Protein Function Prediction (13th place of 1625 teams)
- Open Problems Single-Cell Perturbations (13th place of 1097 teams)

#### **Research Experience**

**2017 December – May 2022:** Laboratory of Experimental Pharmacology and Therapy of Pain, Department of Neuropharmacology (systematic review and meta-analysis, electrophysiology).

Supervisor: Assoc. Prof. Alexey Sokolov, head of the Department of Neuropharmacology, Valdman Institute of Pharmacology and partially – in collaboration with the Finnish group led by Prof. Rashid Giniatullin, A. I. Virtanen Institute for Molecular Sciences, University of Eastern Finland, Kuopio.

Methods used: Extracellular recordings of neuronal activity the trigeminocervical complex and thalamus in rats; Intravital microscopy of meningeal arteries in rats.

Skills: catheterization of femoral artery and vein; tracheostomy; stereotactic surgery; Spike2 software; statistical analysis using Prism and SPSS software, R and Python programming languages.

**2016 June -2018 January:** Laboratory of Behavioral Pharmacology, Department of Psychopharmacology (behavioural animal models, operant conditioning).

### Supervisor: Dr. I. Sukhanov

Methods used: Two-choice serial reaction time task in rats; Schedule-induced polydipsia in rats; Pavlovian/Instrumental Autoshaping Learning Task in rats; Pavlovian Autoshaping in rats; Intravenous self-administration in mice.

Skills: handling with rats and mice; intraperitoneal and subcutaneous injections in rats and mice; catheterization of jugular vein in mice; dissection of rodent brain regions; statistical analysis using SigmaPlot software; MED-PC programming

# Appointments

Biostatistician, R-Pharm (May 2022 - present) (Mainly work on data analysis and reporting automation for different design clinical studies with R)

Medical translator, Falk online mediacenter, Dr. Falk/Falk Foundation (June 2020 – February 2022)

Medical writer, X7 Research (February 2019 – August 2019)

Junior Researcher, Laboratory of Experimental Pharmacology and Therapy of Pain, Department of Neuropharmacology, Valdman Institute of Pharmacology, Pavlov First Saint Petersburg State Medical University, Saint Petersburg, Russia (2017 December – April 2022)

Junior Researcher, Laboratory of Behavioural Pharmacology, Department of Psychopharmacology, Valdman Institute of Pharmacology, Pavlov First Saint Petersburg State Medical University, Saint Petersburg, Russia (2016 June – 2018 January)

# Professional training

- Curriculum "Introduction to NGS technologies. Working with data sequencing.", Moscow, Russia (27 January 2023 01 February 2023).
- Online courses "Rigorous Statistics for Academics and Practitioners 2022" by Asst. Prof. Michal Fabinger (University of Tokyo, Japan), <u>Acalonia school</u>, (29 March August 2022).
- Online courses: "Advanced Generative Adversarial Networks", "Neural Network Introduction", "Natural Language Processing Introduction", by Asst. Prof. Michal Fabinger (University of Tokyo, Japan), <u>Acalonia school</u> (March – April 2022).
- Mentee in the ECNP Mentorship programme 2020 from June 2020 to February 2022, the mentor was Dr. Avraham Avital <u>https://bnl.net.technion.ac.il/</u>
- Online courses "Regression Analysis" (February 2020 June 2021) and "Computer Vision" by Asst. Prof. Michal Fabinger (University of Tokyo, Japan) at <u>Tokyo Data Science</u>, February 2020 July 2021 (weekly).
- Online courses "Neural Network Essentials" and "Probability and Statistics" by Asst. Prof. Michal Fabinger (University of Tokyo, Japan) at <u>Tokyo Data Science</u>, September 2020 December 2020 (weekly).
- <u>Open Online R Streams</u> by Assoc. Prof. Wolfgang Viechtbauer (advanced R) (Maastricht University, The Netherlands), 8 October 2020 March 2023 (weekly).
- Attendee of the ECNP Workshop for Early Career Scientists in Europe, 7 10 March 2019, Nice, France.

ECNP Network "Preclinical Data Forum" Training Workshop for Young Scientists "How to Make Preclinical Research Robust", Heidelberg, Germany, 3-5 July 2017 (Awarded a certificate of successful completion).

### Grants and awards

- "Best student team solution" at NeurIPS 2024 Predict New Medicines with BELKA (2024)
- "Judges" Prize at Open Problems Single-Cell Perturbations competition (2024)
- CDE Grant at 33<sup>rd</sup> ECNP Congress, 12-15 September 2020 (Virtual)
- ALBA-FKNE-YIBRO diversity grant for participating in the FENS 2020 Virtual Forum
- Diploma of the Scientific Council of Pavlov First Saint Petersburg State Medical University for achievements in research activities, July 2018
- Awardee of the increased state academic scholarship from December 2016 to July 2018
- CDE Grant at 30th ECNP Congress, 2-5 September 2017, Paris, France.
- Russian Foundation for Basic Research (grant #16-34-01016), 2016-2018. Project: Investigation of dopaminergic mechanisms of adaptation to stress

# Teaching

September – December 2019: taught a general pharmacology course for 3<sup>rd</sup> year students at Pavlov State Medical University, Saint Petersburg, Russia

# Publications

# Preprints:

- Chervov, A., Soibelman, A., Lytkin, S., Kiselev, I., Fironov, S., Lukyanenko, A., Dolgorukova, A., Ogurtsov, A., ..., Khoruzhii, K., & Romanov, A. (2025). CayleyPy RL: Pathfinding and Reinforcement Learning on Cayley Graphs. *arXiv*. <u>https://arxiv.org/abs/2502.18663</u>
- Dolgorukova, A., Protsenko, E., Isaeva, J., Gagloeva, V., Verbitskaya, E., & Sokolov, A. Y. (2022). Meta-analysis of the effects of clinically-effective therapeutics in the preclinical migraine model as a tool for design optimisation. *BioRxiv*, 2022.07.05.498780. <u>https://doi.org/10.1101/2022.07.05.498780</u>

### Protocols:

 Dolgorukova, A., Protsenko, E., Isaeva, J., Currie, G., Collins, A., Verbitskaya, E., Bespalov, A., Sokolov, A. Y. (2021). Meta-analysis of the effects of anti-migraine therapeutics in the preclinical electrophysiological model of trigeminovascular nociception. *PROSPERO 2021 CRD42021276448*. Available from:

https://www.crd.york.ac.uk/prospero/display\_record.php?ID=CRD42021276448

### Articles:

- Dolgorukova, A., Protsenko, E., Isaeva, J., Gagloeva, V., Verbitskaya, E., Berkovich, R., & Sokolov, A. Y. (2023). Meta-analysis of the effects of anti-migraine therapeutics in the rat trigeminovascular nociception model as a tool for design optimization. *European Journal* of Neuroscience, 1– 22. <u>https://doi.org/10.1111/ejn.16030</u>
- 2. **Dolgorukova**, A., Osipchuk, A. V., Murzina, A. A., Lyubashina, O. A., & Sokolov, A. Y. (2022). The implementation of transcranial Doppler ultrasonography for preclinical study of

migraine. *Canadian Journal of Physiology and Pharmacology, 100*(6), 553–561. <u>https://doi.org/10.1139/cjpp-2021-0626</u>

- 3. **Dolgorukova**, A. & Sokolov, A. Y. (2021). Electrophysiological model of trigeminovascular nociception as a tool for experimental study of migraine pharmacotherapy. *Russian journal of pain*, *19*(3), 31–38. (In Russ.). <u>https://doi.org/10.17116/pain20211903131</u>
- Soliman, N., Haroutounian, S., Hohmann, A. G., Krane, E., Liao, J., Macleod, M., ... Dolgorukova, A., ..., Rice, A. S. C. (2021). A systematic review and meta-analysis of cannabis-based medicines, cannabinoids and endocannabinoid system modulators tested for antinociceptive effects in animal models of injury-related or pathological persistent pain. *Pain*, *162*, S26-S44. <u>https://doi.org/10.1097/j.pain.00000000002269</u>
- Dolgorukova, A., Isaeva, J. E., Verbitskaya, E., Lyubashina, O. A., Giniatullin, R. A., & Sokolov, A. Y. (2021). Differential effects of the Piezo1 agonist Yoda1 in the trigeminovascular system: An electrophysiological and intravital microscopy study in rats. *Experimental Neurology*, 339, 113634. <u>https://doi.org/10.1016/j.expneurol.2021.113634</u>
- Dolgorukova, A., Osipchuk, A. V., Murzina, A. A., & Sokolov, A. Y. (2020). The Influence of Metoclopramide on Trigeminovascular Nociception: Possible Anti-Migraine Mechanism of Action. *Neuroscience*, 425, 123–133. <u>https://doi.org/10.1016/J.NEUROSCIENCE.2019.11.026</u>
- Dorotenko, A., Tur, M., Dolgorukova, A., Bortnikov, N., Belozertseva, I. V, Zvartau, E. E., ... Sukhanov, I. (2020). The Action of TAAR1 Agonist RO5263397 on Executive Functions in Rats. *Cellular and Molecular Neurobiology*, 40(2), 215–228. <u>https://doi.org/10.1007/s10571-019-00757-6</u>
- Sukhanov, I., Dorotenko, A., Dolgorukova, A., Hoener, M. C., Gainetdinov, R. R., & Bespalov, A. Y. (2019). Activation of trace amine-associated receptor 1 attenuates schedule-induced polydipsia in rats. *Neuropharmacology*, *144*, 184–192. <u>https://doi.org/https://doi.org/10.1016/j.neuropharm.2018.10.034</u>
- Sukhanov, I., Dorofeikova, M., Dolgorukova, A., Dorotenko, A., & Gainetdinov, R. R. (2018). Trace Amine-Associated Receptor 1 Modulates the Locomotor and Sensitization Effects of Nicotine. *Frontiers in Pharmacology*, *9*, 329. <u>https://doi.org/10.3389/fphar.2018.00329</u>
- Mosikian, A., Dolgorukova, A., & Zalevskaya, A. (2016). Possible approaches to CYP2C9-guided prescription of sulfonylureas in Russia. *Pharmacogenomics*, 17(18), 2115–2126. <u>https://doi.org/10.2217/pgs-2016-0121</u>