

BIOGRAPHICAL SKETCH

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NAME: Nadezhdin, Kirill

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POSITION TITLE: Postdoctoral Research Scientist

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Moscow institute of Physics and Technology, Moscow	BS	08/2004	Applied Mathematics and Physics
Moscow institute of Physics and Technology, Moscow	MS	08/2006	Applied Mathematics and Physics
Lomonosov Moscow State University, Moscow	PHD	12/2013	Biophysics

A. Personal Statement

My current scientific interests are focused on lab studies structure and function of ion channels, including transient receptor potential (TRP) channels, using a combination of biochemical and biophysical methods and cryo-electron microscopy (cryo-EM) in particular. I have an expertise in solving structures of integral membrane proteins by both solution NMR and cryo-EM and an extensive experience in using methods of characterizing ion channels function, single channel physiological recordings and Fura-2-based ratiometric fluorescent measurements of intracellular calcium. With such expertise and experiences during my postdoctoral training, I studied structures of human TRPV6, squirrel TRPV1, mouse TRPV3 and algae TRP1 and other TRP channels in different conformations, in complex with various ligands and at different physiological temperatures. As a result of my previous experiences, I am aware of the importance of frequent communication among project members and of constructing a realistic research plan and timeline.

B. Positions, Scientific Appointments, and Honors**Positions and Employment**

- (2014) – teacher assistant, Moscow Institute of Physics and Technology, Department of Biological and Medical Physics, Moscow, Russia
- (2015 – 2018) – vice dean of education, Moscow Institute of Physics and Technology, Department of Biological and Medical Physics, Moscow, Russia
- (2017-2019) – teaching assistant professor, Moscow Institute of Physics and Technology, Department of Biological and Medical Physics, Moscow, Russia
- (2013 – 2018) – research scientist, Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry, Russian Academy of Sciences, Department of Structural Biology, Laboratory of Biomolecular NMR Spectroscopy, Moscow, Russia
- (2018-2019) – senior research scientist, Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry, Russian Academy of Sciences, Department of Structural Biology, Laboratory of Biomolecular NMR Spectroscopy, Moscow, Russia
- (2019 – present) – postdoctoral research scientist, Sobolevsky lab, Department of Biochemistry and Molecular Biophysics, Columbia University Irving Medical Center, New York, NY 10032

Honors

- (2006) – Yu.A.Ovchinnikov scholarship for undergraduate students
- (2015-2017) – Presidential young scientist scholarship
- (2012) – Biophysical society 56th Annual Meeting, 2012 International Relations Committee Travel Award

C. Contributions to Science

Publications during postdoctoral training in Alexander Sobolevsky's lab at Columbia University Irving Medical Center

1. Yelshanskaya MV, **Nadezhdin KD**, Kurnikova MG, Sobolevsky AI. Structure and Function of the calcium-selective TRP channel TRPV6. *J Physiology*, 2020 Feb 19. doi: 10.1113/JP279024.
2. **Nadezhdin, K.D.***, Neuberger, A.*, Nikolaev, Y.A. et al. Extracellular cap domain is an essential component of the TRPV1 gating mechanism. *Nat Commun* 12, 2154 (2021). ***co-first authorship**
3. Bhardwaj R*, Lindinger S*, Neuberger A*, **Nadezhdin KD***, Singh AK, Cunha MR, Derler I, Gyimesi G, Reymond JL, Hediger MA, Romanin C, Sobolevsky AI. Inactivation-mimicking block of the epithelial calcium channel TRPV6. *Science Advances*. 2020 Nov 27;6(48):eabe1508. ***co-first authorship**
4. Neuberger A*, **Nadezhdin KD***, Sobolevsky AI. TRPV3 expression and purification for structure determination by Cryo-EM. *Methods in Enzymology*. 2021 ;652:31-48. ***co-first authorship**

Previous publications (selected)

1. Franco ML*, Nadezhdin KD*, Goncharuk SA, Mineev KS, Arseniev AS, Vilar M. Structural basis of the transmembrane domain dimerization and rotation in the activation mechanism of the TRKA receptor by nerve growth factor. *J Biol Chem*. 2020 Jan 3;295(1):275-286. doi: 10.1074/jbc.RA119.011312.
2. Gafskaya EN, Nadezhdin KD, Talyzina IA, Polina NF, Podgorny OV, Pavlova ER, Bashkirov PV, Kharlampieva DD, Bobrovsky PA, Latsis IA, Manuvera VA, Babenko VV, Trukhan VM, Arseniev AS, Klinov DV, Lazarev VN. Medicinal leech antimicrobial peptides lacking toxicity represent a promising alternative strategy to combat antibiotic-resistant pathogens. *Eur J Med Chem*. 2019 Oct 15;180:143-153. doi: 10.1016/j.ejmech.2019.06.080.
3. Bocharov EV, Nadezhdin KD, Urban AS, Volynsky PE, Pavlov KV, Efremov RG, Arseniev AS, Bocharova OV. Familial L723P Mutation Can Shift the Distribution between the Alternative APP Transmembrane Domain Cleavage Cascades by Local Unfolding of the E-Cleavage Site Suggesting a Straightforward Mechanism of Alzheimer's Disease Pathogenesis. *ACS Chem Biol*. 2019 Jul 19;14(7):1573-1582. doi: 10.1021/acschembio.9b00309.
4. Nadezhdin KD, Goncharuk SA, Arseniev AS, Mineev KS. NMR structure of a full-length single-pass membrane protein NRADD. *Proteins*. 2019 Sep;87(9):786-790. doi: 10.1002/prot.25703
5. Nadezhdin KD, Romanovskaia DD, Sachkova MY, Oparin PB, Kovalchuk SI, Grishin EV, Arseniev AS, Vassilevski AA. Modular toxin from the lynx spider *Oxyopes takobius*: Structure of spiderine domains in solution and membrane-mimicking environment. *Protein Sci*. 2017 Mar;26(3):611-616. doi: 10.1002/pro.3101.
6. Mineev KS, Nadezhdin KD, Goncharuk SA, Arseniev AS. Characterization of Small Isotropic Bicelles with Various Compositions. *Langmuir*. 2016 Jul 5;32(26):6624-37. doi: 10.1021/acs.langmuir.6b00867.
7. Nadezhdin KD*, García-Carpio I*, Goncharuk SA, Mineev KS, Arseniev AS, Vilar M. Structural Basis of p75 Transmembrane Domain Dimerization. *J Biol Chem*. 2016 Jun 3;291(23):12346-57. doi: 10.1074/jbc.M116.723585.
8. Nadezhdin KD, Bocharova OV, Bocharov EV, Arseniev AS. Dimeric structure of transmembrane domain of amyloid precursor protein in micellar environment. *FEBS Lett*. 2012 Jun 12;586(12):1687-92. doi: 10.1016/j.febslet.2012.04.062

9. Nadezhdin KD, Bocharova OV, Bocharov EV, Arseniev AS. Structural and dynamic study of the transmembrane domain of the amyloid precursor protein. *Acta Naturae*. 2011 Jan;3(1):69-76.
10. Grishin EV, Savchenko GA, Vassilevski AA, Korolkova YV, Boychuk YA, Viatchenko-Karpinski VY, Nadezhdin KD, Arseniev AS, Pluzhnikov KA, Kulyk VB, Voitenko NV, Krishtal OO. Novel peptide from spider venom inhibits P2X3 receptors and inflammatory pain. *Ann Neurol*. 2010 May;67(5):680-3. doi: 10.1002/ana.21949.
11. Shenkarev ZO, Nadezhdin KD, Lyukmanova EN, Sobol VA, Skjeldal L, Arseniev AS. Divalent cation coordination and mode of membrane interaction in cyclotides: NMR spatial structure of ternary complex Kalata B7/Mn²⁺/DPC micelle. *J Inorg Biochem*. 2008 May-Jun;102(5-6):1246-56. doi: 10.1016/j.jinorgbio.2008.01.018.
12. Ovchinnikova TV, Shenkarev ZO, Balandin SV, Nadezhdin KD, Paramonov AS, Kokryakov VN, Arseniev AS. Molecular insight into mechanism of antimicrobial action of the beta-hairpin peptide arenicin: specific oligomerization in detergent micelles. *Biopolymers*. 2008 May;89(5):455-64.
13. Shenkarev ZO, Nadezhdin KD, Sobol VA, Sobol AG, Skjeldal L, Arseniev AS. Conformation and mode of membrane interaction in cyclotides. Spatial structure of kalata B1 bound to a dodecylphosphocholine micelle. *FEBS J*. 2006 Jun;273(12):2658-72.