Curriculum vitae: Sergey Goncharuk



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Education

2008–2008	Russia, Moscow	Moscow State University, biological faculty, department of bioengineering	Ph.D. in biology (biophysics).
2005–2008	Russia, Dolgoprudniy	Moscow Institute of Physics and Technology (State University) (MIPT)	Ph.D student.
2002–2005	Russia, Moscow	M.M. Shemyakin and Yu.A. Ovchinnikov Institute of bioorganic chemistry, Educational and Scientific Center	
1999–2005	Russia, Dolgoprudniy	Moscow Institute of Physics and Technology (State University) (MIPT)	Bachelor. Master's degree.

Work experience

2020–to date	Russia, Dolgoprudniy	MIPT	AP
2002–to date	Russia, Moscow	Shemyakin-Ovchinnikov Institute of bioorganic chemistry	
2008–2018	Russia, Moscow	Lomonosov MSU	senior researcher

IBCh positions

2018–to date	Senior research fellow	
2026–to date	Associate Professor	
2008–2018	Research fellow	
2002–2008	Junior research fellow	

Language Proficiency

russian, english

Scientific societies’ membership

FEBS

Titles

2009	Doctor of Philosophy (Biological sciences)

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Grants and projects

2025–to date	-Исследование конформационной динамики при распознавании лигандов, активации и передаче сигнала хемокиновыми рецепторами
2025–to date	-Роль примембранных регионов в функционировании нейротрофиновых рецепторов
2022–2024	Structural basis of functioning of the neurotrophin receptors
2020–2022	Investigation of membrane proteins P75 and SORCS2 interaction in the process of intracellular signaling
2018–2023	-Разработка новых молекулярных инструментов ферментативного и флуорогенного флуоресцентного мечения для прижизненной визуализации в живых системах
2017–2018	-
2019–2022	Structural biology of membrane proteins for the development of new drugs and diagnostics
2020–2022	The role of extracellular juxtamembrane region and transmembrane domain of the neurotrophin receptor TrkA in signal transduction
2020–2021	Elucidating the structural basis of toll-like receptor signaling by NMR in solution
2014–2018	Structural basis of molecular mechanisms of signal transduction by the type I integral membrane proteins

Publications

1. Kornilov FD, Shabalkina AV, Goncharuk MV, Bocharov EV, **Goncharuk SA**, Mineev KS (2026). Transmembrane domains of TLR1 and TLR2 tend to specific heterotypic interaction. *Biochem Biophys Res Commun* 830, 154252, 10.1016/j.bbrc.2026.154252
2. Goncharuk MV, Dubinnyi MA, Nekrasova OV, Anurieva AS, Kuzmichev PK, Chupin VV, Okhrimenko IS, Borshchevskiy VI, Bocharov EV, Arseniev AS, **Goncharuk SA** (2026). Bicelles as a Prospective Membrane Mimetic for NMR Structural Studies of Bacteriorhodopsin. *Russ. J. Bioorganic Chem.* 52 (3), 82, 10.1134/S1068162026601345
3. Bulgakova UV, Balagurov KI, Rudenko AY, Aysin KN, **Goncharuk SA**, Mariasina SS, Georgiev PG, Bocharov EV, Polshakov VI (2026). Structural Biology of Zinc-Binding Proteins and Peptides. *Russ. J.*

Bioorganic Chem. 52 (3), 75, 10.1134/S1068162026601655
4. Dubinnyi MA, Bukhdruker SS, Borshchevskiy VI, Goncharuk MV, Okhrimenko IS, Bocharov EV, **Goncharuk SA** (2026). Structural Studies of Bacteriorhodopsin: What Do We Know and What Did We Miss? *Russ. J. Bioorganic Chem.* 52 (3), , 10.1134/S1068162026601734
5. Lin C, Li P, Savitskaya AG, Lyukmanova E, **Goncharuk SA**, Mineev KS, Du X, Wang Y, Wang X (2026). HMGB1 Binds to and Disrupts the Hairpin Structure of RNA15 and Inhibits Toll-like Receptor Activation. *J Biol Chem* 302 (3), 111155, 10.1016/j.jbc.2026.111155
6. Gilvanov AR, Molchanova MV, Krasnova SA, Eshtukov-Shcheglov AV, Mikhaylov AA, **Goncharuk SA**, Goncharuk MV, Sidorenko SV, Maksimov EG, Baranov MS, Bogdanova YA (2025). Bathochromic Shift via C=O to C=S Substitution: A Far-Red Fluorogen for Multiplexed FLIM with FAST Fluorogen-Activating Protein. *Int J Mol Sci* 27 (1), 23, 10.3390/ijms27010023
7. Lushpa VA, Goncharuk MV, Arseniev AS, Mineev KS, **Goncharuk SA** (2025). Effect of Intrinsically Disordered Regions on the Expression of TIR Domains of the Toll-like Receptor in the Soluble Form. *Russ. J. Bioorganic Chem.* 51 (3), 1092–1098, 10.1134/S1068162024606670
8. Gilvanov AR, Myasnyanko IN, **Goncharuk SA**, Goncharuk MV, Kublitski VS, Bodunova DV, Sidorenko SV, Maksimov EG, Baranov MS, Bogdanova YA (2025). Fluorescence Lifetime Multiplexing with Fluorogen-Activating FAST Protein Variants and Red-Shifted Arylidene–Imidazolone Derivative as Fluorogen. *Biosensors (Basel)* 15 (5), 274, 10.3390/bios15050274
9. Lushpa VA, Lin C, Talyzina IA, Goncharuk MV, Bocharov EV, Arseniev AS, Wang X, **Goncharuk SA**, Mineev KS (2025). The intracellular domain of TLR2 is capable of high-affinity Zn binding: possible outcomes for the receptor activation. *FEBS Lett* 599 (13), 1864–1879, 10.1002/1873-3468.70026
10. Bedanokova DR, Goncharuk MV, Shabalkina AV, Lushpa VA, Arseniev AS, Bocharov EV, Mineev KS, **Goncharuk SA** (2024). Production and Refolding of the Ligand-Binding Domain of TrkA Receptor with the Extracellular Juxtamembrane Region. *Russ. J. Bioorganic Chem.* 50 (6), 2589–2595, 10.1134/S1068162024060232
11. Bogdanova YA, Solovyev ID, Baleeva NS, Myasnyanko IN, Gorshkova AA, Gorbachev DA, Gilvanov AR, **Goncharuk SA**, Goncharuk MV, Mineev KS, Arseniev AS, Bogdanov AM, Savitsky AP, Baranov MS (2024). Fluorescence lifetime multiplexing with fluorogen activating protein FAST variants.*Commun Biol* 7 (1), 799, 10.1038/s42003-024-06501-1
12. Kot EF, **Goncharuk SA**, Franco ML, McKenzie DM, Arseniev AS, Benito-Martínez A, Costa M, Cattaneo A, Hristova K, Vilar M, Mineev KS (2024). Structural basis for the transmembrane signaling and antidepressant-induced activation of the receptor tyrosine kinase TrkB. *Nat Commun* 15 (1), 9316, 10.1038/s41467-024-53710-7
13. Motov VV, Kot EF, Kislova SO, Bocharov EV, Arseniev AS, Boldyrev IA, **Goncharuk SA**, Mineev KS (2024). On the Properties of Styrene–Maleic Acid Copolymer–Lipid Nanoparticles: A Solution NMR Perspective. *Polymers (Basel)* 16 (21), 3009, 10.3390/polym16213009
14. Lushpa VA, Goncharuk MV, Talyzina IA, Arseniev AS, Bocharov EV, Mineev KS, **Goncharuk SA** (2024). TIR domains of TLR family-from the cell culture to the protein sample for structural studies. *PLoS One* 19 (7), e0304997, 10.1371/journal.pone.0304997
15. Diniz CRAF, Crestani AP, Casarotto PC, Biojone C, Cannarozzo C, Winkel F, Prozorov MA, Kot EF, **Goncharuk SA**, Marques DB, Zacharias LR, Autio H, Sahu MP, Borges-Assis AB, Leite JP, Mineev KS, Castrén E, Resstel LBM (2024). Fluoxetine and Ketamine Enhance Extinction Memory and Brain Plasticity by Triggering the p75 Neurotrophin Receptor Proteolytic Pathway. *Biol Psychiatry* 97 (3), 248–260, 10.1016/j.biopsych.2024.06.021
16. Kislova S, Motov V, Myasnyanko I, Pytskii I, **Goncharuk S**, Boldyrev I (2024). Conformational transitions of maleic acid segment drive pH induced changes in SMA polymer structure and solubility. *J Mol Liq* 398, , 10.1016/j.molliq.2024.124302
17. Baleeva NS, Bogdanova YA, Goncharuk MV, Sokolov AI, Myasnyanko IN, Kublitski VS, Smirnov AY, Gilvanov AR, **Goncharuk SA**, Mineev KS, Baranov MS (2024). A Combination of Library Screening and Rational Mutagenesis Expands the Available Color Palette of the Smallest Fluorogen-Activating Protein

Tag nanoFAST. *Int J Mol Sci* 25 (5), , 10.3390/ijms25053054
18. Goncharuk MV, Vasileva EV, Ananiev EA, Gorokhovatsky AY, Bocharov EV, Mineev KS, **Goncharuk SA** (2023). Facade-Based Bicelles as a New Tool for Production of Active Membrane Proteins in a Cell-Free System. *Int J Mol Sci* 24 (19), , 10.3390/ijms241914864
19. Moliner R, Girych M, Brunello CA, Kovaleva V, Biojone C, Enkavi G, Antenucci L, Kot EF, **Goncharuk SA**, Kaurinkoski K, Kuutti M, Fred SM, Elsilä LV, Sakson S, Cannarozzo C, Diniz CRAF, Seiffert N, Rubiolo A, Haapaniemi H, Meshi E, Nagaeva E, Öhman T, Róg T, Kankuri E, Vilar M, Varjosalo M, Korpi ER, Permi P, Mineev KS, Saarma M, Vattulainen I, Casarotto PC, Castrén E (2023). Psychedelics promote plasticity by directly binding to BDNF receptor TrkB. *Nat Neurosci* 26 (6), 1032–1041, 10.1038/s41593-023-01316-5
20. Bogdanova YA, Zaitseva ER, Smirnov AY, Baleeva NS, Gavrikov AS, Myasnyanko IN, **Goncharuk SA**, Kot EF, Mineev KS, Mishin AS, Baranov MS (2023). NanoLuc Luciferase as a Fluorogen-Activating Protein for GFP Chromophore Based Fluorogens. *Int J Mol Sci* 24 (9), 7958, 10.3390/ijms24097958
21. Kornilov FD, Slonimskiy YB, Lunegova DA, Egorkin NA, Savitskaya AG, Kleymenov SY, Maksimov EG, **Goncharuk SA**, Mineev KS, Sluchanko NN (2023). Structural basis for the ligand promiscuity of the neofunctionalized, carotenoid-binding fasciclin domain protein AstaP. *Commun Biol* 6 (1), 471, 10.1038/s42003-023-04832-z
22. Kornilov FD, Shabalkina AV, Lin C, Volynsky PE, Kot EF, Kayushin AL, Lushpa VA, Goncharuk MV, Arseniev AS, **Goncharuk SA**, Wang X, Mineev KS (2023). The architecture of transmembrane and cytoplasmic juxtamembrane regions of Toll-like receptors. *Nat Commun* 14 (1), 1503, 10.1038/s41467-023-37042-6
23. Goncharuk MV, Baleeva NS, Nolde DE, Gavrikov AS, Mishin AV, Mishin AS, Sosorev AY, Arseniev AS, **Goncharuk SA**, Borshchevskiy VI, Efremov RG, Mineev KS, Baranov MS (2022). Structure-based rational design of an enhanced fluorogen-activating protein for fluorogens based on GFP chromophore. *Commun Biol* 5 (1), 706, 10.1038/s42003-022-03662-9
24. Motov VV, Kot EF, Shabalkina AV, **Goncharuk SA**, Arseniev AS, Goncharuk MV, Mineev KS (2022). Investigation of lipid/protein interactions in trifluoroethanol-water mixtures proposes the strategy for the refolding of helical transmembrane domains. *J Biomol NMR* 77 (1-2), 15–24, 10.1007/s10858-022-00408-x
25. Lushpa VA, Baleeva NS, **Goncharuk SA**, Goncharuk MV, Arseniev AS, Baranov MS, Mineev KS (2022). Spatial Structure of NanoFAST in the Apo State and in Complex with its Fluorogen HBR-DOM2. *Int J Mol Sci* 23 (19), , 10.3390/ijms231911361
26. Artemieva LE, Mineev KS, Arseniev AS, **Goncharuk SA** (2022). Expression, purification and characterization of SORCS2 intracellular domain for structural studies. *Protein Expr Purif* 193, 106058, 10.1016/j.pep.2022.106058
27. Kot EF, Franco ML, Vasilieva EV, Shabalkina AV, Arseniev AS, **Goncharuk SA**, Mineev KS, Vilar M (2022). Intrinsically disordered regions couple the ligand binding and kinase activation of Trk neurotrophin receptors. *iScience* 25 (6), 104348, 10.1016/j.isci.2022.104348
28. Lushpa VA, Goncharuk MV, Lin C, Zalevsky AO, Talyzina IA, Luginina AP, Vakhrameev DD, Shevtsov MB, **Goncharuk SA**, Arseniev AS, Borshchevskiy VI, Wang X, Mineev KS (2021). Modulation of Toll-like receptor 1 intracellular domain structure and activity by Zn2+ ions. *Commun Biol* 4 (1), 1003, 10.1038/s42003-021-02532-0
29. Franco ML, Nadezhdin KD, Light TP, **Goncharuk SA**, Soler-Lopez A, Ahmed F, Mineev KS, Hristova K, Arseniev AS, Vilar M (2021). Interaction between the transmembrane domains of neurotrophin receptors p75 and TrkA mediates their reciprocal activation. *J Biol Chem* 297 (2), 100926, 10.1016/j.jbc.2021.100926
30. Mineev KS, **Goncharuk SA**, Goncharuk MV, Povarova NV, Sokolov AI, Baleeva NS, Smirnov AY, Myasnyanko IN, Ruchkin DA, Bukhdruker S, Remeeva A, Mishin A, Borshchevskiy V, Gordeliy V, Arseniev AS, Gorbachev DA, Gavrikov AS, Mishin AS, Baranov MS (2021). NanoFAST: structure-based design of a small fluorogen-activating protein with only 98 amino acids. *Chem Sci* 12 (19), 6719–6725,

10.1039/d1sc01454d
31. Gorokhovatsky AY, Chepurnykh TV, Shcheglov AS, Mokrushina YA, Baranova MN, **Goncharuk SA**, Purtov KV, Petushkov VN, Rodionova NS, Yampolsky IV (2021). The Recombinant Luciferase of the Fungus Neonothopanus nambi: Obtaining and Properties. *Dokl Biochem Biophys* 496 (1), 52–55, 10.1134/S1607672921010051
32. Goncharuk MV, Lushpa VA, **Goncharuk SA**, Arseniev AS, Mineev KS (2021). Sampling the cultivation parameter space for the bacterial production of TLR1 intracellular domain reveals the multiple optima. *Protein Expr Purif* 181, 105832, 10.1016/j.pep.2021.105832
33. **Goncharuk SA**, Artemieva LE, Nadezhdin KD, Arseniev AS, Mineev KS (2020). Revising the mechanism of p75NTR activation: intrinsically monomeric state of death domains invokes the 'helper' hypothesis. *Sci Rep* 10 (1), 13686, 10.1038/s41598-020-70721-8
34. Kot EF, Wang Y, **Goncharuk SA**, Zhang B, Arseniev AS, Wang X, Mineev KS (2020). Oligomerization analysis as a tool to elucidate the mechanism of EBV latent membrane protein 1 inhibition by pentamidine. *BIOCHIM BIOPHYS ACTA* 1862 (10), 183380, 10.1016/j.bbamem.2020.183380
35. Franco ML, Nadezhdin KD, **Goncharuk SA**, Mineev KS, Arseniev AS, Vilar M (2019). Structural basis of the transmembrane domain dimerization and rotation in the activation mechanism of the TRKA receptor by nerve growth factor. *J Biol Chem* 295 (1), 275–286, 10.1074/jbc.RA119.011312
36. Nadezhdin KD, **Goncharuk SA**, Arseniev AS, Mineev KS (2019). NMR structure of a full-length single-pass membrane protein NRADD. *Proteins* 87 (9), 786–790, 10.1002/prot.25703
37. **Goncharuk SA**, Artemieva LE, Tabakmakher VM, Arseniev AS, Mineev KS (2018). CARD domain of rat RIP2 kinase: Refolding, solution structure, pH-dependent behavior and protein-protein interactions. *PLoS One* 13 (10), e0206244, 10.1371/journal.pone.0206244
38. Kot EF, **Goncharuk SA**, Arseniev AS, Mineev KS (2018). Phase Transitions in Small Isotropic Bicelles. *Langmuir* 34 (11), 3426–3437, 10.1021/acs.langmuir.7b03610
39. Mineev KS, **Goncharuk SA**, Goncharuk MV, Volynsky PE, Novikova EV, Aresinev AS (2017). Spatial structure of TLR4 transmembrane domain in bicelles provides the insight into the receptor activation mechanism. *Sci Rep* 7 (1), 6864, 10.1038/s41598-017-07250-4
40. Mineev KS, Nadezhdin KD, **Goncharuk SA**, Arseniev AS (2017). Façade detergents as bicelle rim-forming agents for solution NMR spectroscopy. *Nanotechnol Rev* 6 (1), 93–103, 10.1515/ntrev-2016-0069
41. Mineev KS, Nadezhdin KD, **Goncharuk SA**, Arseniev AS (2016). Characterization of Small Isotropic Bicelles with Various Compositions. *Langmuir* 32 (26), 6624–6637, 10.1021/acs.langmuir.6b00867
42. Nadezhdin KD, García-Carpio I, **Goncharuk SA**, Mineev KS, Arseniev AS, Vilar M (2016). Structural basis of p75 transmembrane domain dimerization. *J Biol Chem* 291 (23), 12346–12357, 10.1074/jbc.M116.723585
43. Bocharova OV, Bragin PE, Bocharov EV, Mineev KS, **Goncharuk SA**, Arseniev AS (2016). Cell-free expression and purification of the fragments of the receptor tyrosine kinases of the EGFR family, containing the transmembrane domain with the juxtamembrane region, for structural studies. *Biochem (Mosc) Suppl Ser A Membr Cell Biol* 10 (2), 142–149, 10.1134/S1990747816020045
44. Bocharova OV, Bragin PE, Bocharov EV, Mineev KS, **Goncharuk SA**, Arseniev AS (2016). Cell Free expression and purification of the fragments of the receptor tyrosine kynases of the EGFR Family, containing the transmembrane domain with the juxtamembrane region, for structural studies. *BIOL MEMBRANY* 33 (2), 124–132, 10.7868/S0233475516020043
45. Bocharova OV, Kuzmichev PK, Urban AS, **Goncharuk SA**, Bocharov EV, Arsenyev AS (2015). Preparation of growth hormone receptor GHR-(254-298) transmembrane fragments in a cell-free expression system for structural studies. *Russ. J. Bioorganic Chem.* 41 (6), 631–637, 10.1134/S1068162015060047
46. Mineev KS, **Goncharuk SA**, Kuzmichev PK, Vilar M, Arseniev AS (2015). NMR Dynamics of Transmembrane and Intracellular Domains of p75NTR in Lipid-Protein Nanodiscs. *Biophys J* 109 (4), 772–782, 10.1016/j.bpj.2015.07.009

47. Mineev KS, **Goncharuk SA**, Arseniev AS (2014). Toll-like receptor 3 transmembrane domain is able to perform various homotypic interactions: An NMR structural study. *FEBS Lett* 588 (21), 3802–3807, 10.1016/j.febslet.2014.08.031
48. Mineev KS, Lesovoy DM, Usmanova DR, **Goncharuk SA**, Shulepko MA, Lyukmanova EN, Kirpichnikov MP, Bocharov EV, Arseniev AS (2014). NMR-based approach to measure the free energy of transmembrane helix-helix interactions. *BIOCHIM BIOPHYS ACTA* 1838 (1), 164–172, 10.1016/j.bbamem.2013.08.021
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51. Goncharuk MV, Shulga AA, Ermoliuk IS, Tkach EN, **Goncharuk SA**, Pustovalova IE, Mineev KS, Bocharov EV, Maslennikov IV, Arsenev AS, Kirpichnikov MP (2011). [Bacterial synthesis, purification, and solubilization of transmembrane segments of ErbB family members]. *Mol Biol (Mosk)* 45 (5), 892–902.
52. **(conference)** Lesovoy DM, Bocharov EV, Mayzel ML, **Goncharuk SA**, Goncharuk MV, Volynsky PE, Efremov RG, Arseniev AS (2011). Structural and dynamical model of transmembrane domain of fibroblast growth factor receptor 3. *EUROMAR 2011* , 191.
53. **Goncharuk SA**, Goncharuk MV, Mayzel ML, Lesovoy DM, Chupin VV, Bocharov EV, Arseniev AS, Kirpichnikov MP (2011). Bacterial Synthesis and Purification of Normal and Mutant Forms of Human FGFR3 Transmembrane Segment. *Acta Naturae* 3 (3), 77–84.
54. **Goncharuk SA**, Shulga AA, Ermolyuk YS, Kuzmichev PK, Sobol VA, Bocharov EV, Chupin VV, Arseniev AS, Kirpichnikov MP (2009). Bacterial synthesis, purification, and solubilization of membrane protein KCNE3, a regulator of voltage-gated potassium channels. *Biochemistry (Mosc)* 74 (12), 1344–1349, 10.1134/S0006297909120074