

## CURRICULUM VITAE

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### EDUCATION:

1992 Ph.D. in Biochemistry, Institute of Biochemistry  
& Physiology of Microorganisms, Russian Academy  
of Sciences, Pushchino, Moscow Region, RUSSIA  
1986 B.Sc., M.Sc. in Biochemistry, Moscow State University,  
Department of Biology, Chair of Biochemistry.

### PROFESSIONAL POSITIONS:

02/2004- Present Research Instructor, Department of Pharmacology, School of  
Medicine, Vanderbilt University, Nashville, TN 37232  
10/2001-01/2004 Research Fellow, Department of Pharmacology, School of Medicine,  
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12/1997-10/2001 Post Doctoral Fellow, R&M Roberts Center for Vision  
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6/1995-12/1997 Researcher, Institute of Biochemistry & Physiology  
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Lab. of Anaerobic Processes, Pushchino, Moscow  
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2/1990-5/1995 Junior Researcher, Institute of Biochemistry &  
Physiology of Microorganisms, Russian Academy of  
Sciences, Lab. of Anaerobic Processes, Pushchino,  
Moscow Region, RUSSIA  
12/1986-2/1990 Post Graduate, Institute of Biological Physics  
Lab. Functional Biochemistry (headed by Prof. Yu.V.  
Evtodienko), Pushchino, Moscow Region, RUSSIA  
1985-1986 M.Sc. theses, Chair of Biochemistry, Department of Biology,  
Moscow State University, Moscow

## PROFESSIONAL SOCIETIES:

Russian Biochemical Society, since 1997

The Association for Research in Vision and Ophthalmology, since 1998

American Chemical Society, since 2000

## TEACHING EXPERIENCE

2010-2011 Teaching Assistant, Vanderbilt University, Nashville TN

Course: **Interdisciplinary Graduate Program (IGP) Focus Group** (with Professor James G. Patton) Assisted in the scientific development of graduate students in learning to read and understand peer-reviewed scientific articles.

## HONORS AND AWARDS

1993 Personal Grant to support research of Russian Scientists, International Science Foundation

1993-1994 Analysis of microbial consortia formation and function regularity in anaerobic reactors. Use of their biotechnological properties for purification of local wastewaters containing dissolved organic substances. Ministry of Science of Russian Federation

1996-1997 Study of mechanisms of separation of carbon isotopes by methane-forming microorganisms. Russian Foundation for Fundamental Research (RFFR # 96-04-49161-a)

## PUBLICATIONS IN PEER-REVIEWED JOURNALS:

1. Samaranayake S., Song X., **Vishnivetskiy S.A.**, Chen J., Gurevich E.V., Gurevich V.V. (2018) Enhanced Mutant Compensates for Defects in Rhodopsin Phosphorylation in the Presence of Endogenous Arrestin-1. *Front Mol Neurosci.* **11**, 203.
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3. Tso S.C., Chen Q., **Vishnivetskiy S.A.**, Gurevich V.V., Iverson T.M., Brautigam C.A. (2018) Using two-site binding models to analyze microscale thermophoresis data. *Anal Biochem.* **540-541**, 64-75.
4. Chen Q, Perry N.A., **Vishnivetskiy S.A.**, Berndt S., Gilbert N.C., Zhuo Y., Singh P.K., Tholen J, Ohi M.D., Gurevich E.V., Brautigam C.A., Klug C.S., Gurevich V.V., Iverson T.M. (2017) Structural basis of arrestin-3 activation and signaling. *Nat Commun.* 8(1):1427.
5. **Vishnivetskiy S.A.**, Lee R.J., Zhou X.E., Franz A., Xu Q., Xu H.E., Gurevich V.V. (2017) Functional role of the three conserved cysteines in the N domain of visual arrestin-1. *J Biol Chem.* 292(30), 12496-12502.
6. Prokop S., Perry N.A., **Vishnivetskiy S.A.**, Toth A.D., Inoue A., Milligan G., Iverson T.M., Hunyady L., Gurevich V.V. (2017) Differential manipulation of arrestin-3 binding to basal and agonist-activated G protein-coupled receptors. *Cell Signal.* 6:98-107.
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- N., Zhao, Y. M., Standfuss, J., Diederichs, K., Dong, Y. H., Potter, C. S., Carragher, B., Caffrey, M., Jiang, H. L., Chapman, H. N., Spence, J. C. H., Fromme, P., Weierstall, U., Ernst, O. P., Katritch, V., Gurevich, V. V., Griffin, P. R., Hubbell, W. L., Stevens, R. C., Cherezov, V., Melcher, K., and Xu, H. E. (2015) Crystal structure of rhodopsin bound to arrestin by femtosecond X-ray laser. *Nature* **523**, 561-567
8. Inagaki, S., Ghirlando, R., **Vishnivetskiy, S. A.**, Homan, K. T., White, J. F., Tesmer, J. J. G., Gurevich, V. V., and Grisshammer, R. (2015) G Protein-Coupled Receptor Kinase 2 (GRK2) and 5 (GRK5) Exhibit Selective Phosphorylation of the Neurotensin Receptor in Vitro. *Biochemistry-US* **54**, 4320-4329
  9. Azevedo, A.W., Doan, T., Moaven, H., Sokal, I., Baameur, F., **Vishnivetskiy, S.A.**, Homan, K.T., Tesmer, J.J., Gurevich, V.V., Chen, J., Rieke, F. (2015) C-terminal threonines and serines play distinct roles in the desensitization of rhodopsin, a G protein-coupled receptor. *Elife*. 2015 Apr 24;4. doi: 10.7554/eLife.05981.
  10. Li, L. Y., Homan, K. T., **Vishnivetskiy, S. A.**, Manglik, A., Tesmer, J. J. G., Gurevich, V. V., and Gurevich, E. V. (2015) G Protein-coupled Receptor Kinases of the GRK4 Protein Subfamily Phosphorylate Inactive G Protein-coupled Receptors (GPCRs). *The Journal of biological chemistry* **290** (17), 10775-10790
  11. Chen, Q., **Vishnivetskiy, S.A.**, Zhuang, T., Cho, M.K., Thaker, T.M., Sanders, C.R., Gurevich, V.V., Iverson, T.M. (2015) The rhodopsin-arrestin-1 interaction in bicelles. *Methods Mol Biol.*, **1271**, 77-95.
  12. Zhuo, Y., **Vishnivetskiy, S. A.**, Zhan, X., Gurevich, V. V., and Klug, C. S. (2014) Identification of Receptor Binding-induced Conformational Changes in Non-visual Arrestins. *The Journal of biological chemistry*, **289**(30), 20991-21002
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  14. Zhuang, T., Chen, Q., Cho, M. K., **Vishnivetskiy, S. A.**, Iverson, T. M., Gurevich, V. V., and Sanders, C. R. (2013) Involvement of distinct arrestin-1 elements in binding to different functional forms of rhodopsin. *Proceedings of the National Academy of Sciences of the United States of America* **110**, 942-947
  15. **Vishnivetskiy, S. A.**, Ostermaier, M. K., Singhal, A., Panneels, V., Homan, K. T., Glukhova, A., Sligar, S. G., Tesmer, J. J., Schertler, G. F., Standfuss, J., and Gurevich, V. V. (2013) Constitutively active rhodopsin mutants causing night blindness are effectively phosphorylated by GRKs but differ in arrestin-1 binding. *Cellular signalling* **25**, 2155-2162
  16. **Vishnivetskiy, S. A.**, Chen, Q., Palazzo, M. C., Brooks, E. K., Altenbach, C., Iverson, T. M., Hubbell, W. L., and Gurevich, V. V. (2013) Engineering visual arrestin-1 with special functional characteristics. *The Journal of biological chemistry* **288**, 3394-3405
  17. **Vishnivetskiy, S. A.**, Baameur, F., Findley, K. R., and Gurevich, V. V. (2013) Critical role of the central 139-loop in stability and binding selectivity of arrestin-1. *The Journal of biological chemistry* **288**, 11741-11750
  18. Song, X., Seo, J., Baameur, F., **Vishnivetskiy, S. A.**, Chen, Q., Kook, S., Kim, M., Brooks, E. K., Altenbach, C., Hong, Y., Hanson, S. M., Palazzo, M. C., Chen, J., Hubbell, W. L., Gurevich, E. V., and Gurevich, V. V. (2013) Rapid degeneration of rod photoreceptors expressing self-association-deficient arrestin-1 mutant. *Cellular signalling* **25**, 2613-2624
  19. Singhal, A., Ostermaier, M. K., **Vishnivetskiy, S. A.**, Panneels, V., Homan, K. T., Tesmer, J. J., Veprintsev, D., Deupi, X., Gurevich, V. V., Schertler, G. F., and Standfuss, J. (2013) Insights into congenital stationary night blindness based on the structure of G90D rhodopsin. *EMBO reports* **14**, 520-526
  20. Kim, M., **Vishnivetskiy, S. A.**, Van Eps, N., Alexander, N. S., Cleghorn, W. M., Zhan, X., Hanson, S. M., Morizumi, T., Ernst, O. P., Meiler, J., Gurevich, V. V., and Hubbell, W. L.

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21. Gimenez, L. E., **Vishnivetskiy, S. A.**, Baameur, F., and Gurevich, V. V. (2012) Manipulation of very few receptor discriminator residues greatly enhances receptor specificity of non-visual arrestins. *The Journal of biological chemistry* **287**, 29495-29505
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  28. Bayburt, T. H., **Vishnivetskiy, S. A.**, McLean, M. A., Morizumi, T., Huang, C. C., Tesmer, J. J., Ernst, O. P., Sligar, S. G., and Gurevich, V. V. (2011) Monomeric rhodopsin is sufficient for normal rhodopsin kinase (GRK1) phosphorylation and arrestin-1 binding. *The Journal of biological chemistry* **286**, 1420-1428
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  32. Hanson, S. M., **Vishnivetskiy, S. A.**, Hubbell, W. L., and Gurevich, V. V. (2008) Opposing effects of inositol hexakisphosphate on rod arrestin and arrestin2 self-association. *Biochemistry* **47**, 1070-1075
  33. **Vishnivetskiy, S. A.**, Raman, D., Wei, J., Kennedy, M. J., Hurley, J. B., and Gurevich, V. V. (2007) Regulation of arrestin binding by rhodopsin phosphorylation level. *The Journal of biological chemistry* **282**, 32075-32083
  34. Hanson, S. M., Van Eps, N., Francis, D. J., Altenbach, C., **Vishnivetskiy, S. A.**, Arshavsky, V. Y., Klug, C. S., Hubbell, W. L., and Gurevich, V. V. (2007) Structure and function of the visual arrestin oligomer. *The EMBO journal* **26**, 1726-1736
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37. Wu, N., Macion-Dazard, R., Nithianantham, S., Xu, Z., Hanson, S. M., **Vishnivetskiy, S. A.**, Gurevich, V. V., Thibonnier, M., and Shoham, M. (2006) Soluble mimics of the cytoplasmic face of the human V1-vascular vasopressin receptor bind arrestin2 and calmodulin. *Molecular pharmacology* **70**, 249-258
38. Wu, N., Hanson, S. M., Francis, D. J., **Vishnivetskiy, S. A.**, Thibonnier, M., Klug, C. S., Shoham, M., and Gurevich, V. V. (2006) Arrestin binding to calmodulin: a direct interaction between two ubiquitous signaling proteins. *Journal of molecular biology* **364**, 955-963
39. Song, X., Raman, D., Gurevich, E. V., **Vishnivetskiy, S. A.**, and Gurevich, V. V. (2006) Visual and both non-visual arrestins in their "inactive" conformation bind JNK3 and Mdm2 and relocalize them from the nucleus to the cytoplasm. *The Journal of biological chemistry* **281**, 21491-21499
40. Hanson, S. M., Francis, D. J., **Vishnivetskiy, S. A.**, Kolobova, E. A., Hubbell, W. L., Klug, C. S., and Gurevich, V. V. (2006) Differential interaction of spin-labeled arrestin with inactive and active phosphorhodopsin. *Proceedings of the National Academy of Sciences of the United States of America* **103**, 4900-4905
41. Hanson, S. M., Francis, D. J., **Vishnivetskiy, S. A.**, Klug, C. S., and Gurevich, V. V. (2006) Visual arrestin binding to microtubules involves a distinct conformational change. *The Journal of biological chemistry* **281**, 9765-9772
42. Sutton, R. B., **Vishnivetskiy, S. A.**, Robert, J., Hanson, S. M., Raman, D., Knox, B. E., Kono, M., Navarro, J., and Gurevich, V. V. (2005) Crystal structure of cone arrestin at 2.3Å: evolution of receptor specificity. *Journal of molecular biology* **354**, 1069-1080
43. Nair, K. S., Hanson, S. M., Mendez, A., Gurevich, E. V., Kennedy, M. J., Shestopalov, V. I., **Vishnivetskiy, S. A.**, Chen, J., Hurley, J. B., Gurevich, V. V., and Slepak, V. Z. (2005) Light-dependent redistribution of arrestin in vertebrate rods is an energy-independent process governed by protein-protein interactions. *Neuron* **46**, 555-567
44. **Vishnivetskiy, S. A.**, Hosey, M. M., Benovic, J. L., and Gurevich, V. V. (2004) Mapping the arrestin-receptor interface. Structural elements responsible for receptor specificity of arrestin proteins. *The Journal of biological chemistry* **279**, 1262-1268
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51. **Vishnivetskiy, S. A.**, Paz, C. L., Schubert, C., Hirsch, J. A., Sigler, P. B., and Gurevich, V. V. (1999) How does arrestin respond to the phosphorylated state of rhodopsin? *The Journal of biological chemistry* **274**, 11451-11454
52. Akimenko, V. K., Khomutov, S. M., Obraztsova, A. Y., **Vishnivetskii, S. A.**, Chuvilskaya, N. A., Laurinavichus, K. S., and Reshetilov, A. N. (1996) A rapid method for detection of *Clostridium thermocellum* by field-effect transistor-based immunodetection, *Journal of Microbiological Methods* **24**, 203-209.
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54. Vaidya, R. U., Hersman, L. E., Zurek, A. K., Butt, D. P., Laurinavichus, K. S., Shcherbakova, V. A., **Vishniveckji, S. A.**, and Golovchenko, N. P. (1996) Microbiologically-influenced corrosion of aluminium 6061 and Al<sub>2</sub>O<sub>3</sub> particle-reinforced aluminium 6061 composite under anaerobic conditions and elevated temperatures: The effect on the UTS and strain to failure, *Corrosion Prevention & Control* **43**, 101-&.
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56. **Vishnivetskii, S. A.**, Rotaru, V. K., and Evtodienko, Y. V. (1992) Properties and Regulation of the Oxidative-Phosphorylation System in the Myxomycete *Physarum-Polycephalum* .1. Preparation and Characterization of the System in Isolated-Mitochondria and Permeabilized Cells, *Biochemistry-Moscow* **57**, 601-609.
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## BOOK CHAPTERS AND INVITED REVIEWS:

1. Gurevich, V.V., Hanson, S.M., Gurevich, E.V., **Vishnivetskiy, S.A.** How Rod Arrestin Achieved Perfection: Regulation of its Availability and Binding Selectivity. In: Signal Transduction in the retina (Kisselev, O., and Fliesler, S.J., Eds), pp 55-88. Methods in Signal Transduction Series, CRC Press (2007).
2. Gurevich, V. V., Song, X., **Vishnivetskiy, S. A.**, and Gurevich, E. V. (2014) Enhanced phosphorylation-independent arrestins and gene therapy. *Handbook of experimental pharmacology* **219**, 133-152
3. Gimenez, L. E., **Vishnivetskiy, S. A.**, and Gurevich, V. V. (2014) Targeting individual GPCRs with redesigned nonvisual arrestins. *Handbook of experimental pharmacology* **219**, 153-170
4. Chen, Q., Zhuo, Y., Kim, M., Hanson, S. M., Francis, D. J., **Vishnivetskiy, S. A.**, Altenbach, C., Klug, C. S., Hubbell, W. L., and Gurevich, V. V. (2014) Self-association of arrestin family members. *Handbook of experimental pharmacology* **219**, 205-223
5. Wiener R., **Vishnivetskiy S.A.**, Gurevich V.V., and Hirsch J.A. Phosphate Sensor and Construction of Phosphorylation Independent Arrestins. In: The Structural Basis of Arrestin Functions (Gurevich V. V., Ed.), pp 69-82. © Springer International Publishing AG 2017.

6. **Vishnivetskiy S.A.**, Hubbell W. L., Klug C. S., and Vsevolod V. Gurevich V.V. GPCR Footprint on Arrestins and Manipulation of Receptor Specificity. In: *The Structural Basis of Arrestin Functions* (Gurevich V.V., Ed.), pp 133-142. © Springer International Publishing AG 2017.

## ABSTRACTS:

1. **S.A. Vishnivetskiy**, L.S. Sullivan, S.J. Bowne, S.P. Daiger, E. Gurevich, V.V. Gurevich. Molecular defects of the disease-causing human arrestin-1 C147F mutant. ARVO Annual Meeting, Honolulu, HI, *Invest. Ophthalmol. Vis. Sci.*, **59**(9): 3062, 2018.
2. S.A. Samaranyake, **S.A. Vishnivetskiy**, K.C. Thibeault, E. Gurevich, V.V. Gurevich. High expression of monomeric arrestin-1 causes retinal degeneration. ARVO Annual Meeting, Honolulu, HI, *Invest. Ophthalmol. Vis. Sci.*, **59**(9): 3063, 2018.
3. V.V. Gurevich, N. Van Eps, **S.A. Vishnivetskiy**, L. Shamambo, N. A. Perry, W.L. Hubbell. Conformational flexibility of the arrestin-rhodopsin complex. ARVO Annual Meeting, Honolulu, HI, *Invest. Ophthalmol. Vis. Sci.*, **59**(9): 2354, 2018.
4. **S. A. Vishnivetskiy**, L. S. Sullivan, S. J. Bowne, S. P. Daiger, V. V. Gurevich. Human arrestin-1 C147F mutation: why does it cause retinal degeneration? South-Eastern Visual Conference, Oct 2-3, Vanderbilt University, Nashville, TN, 2017.
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