

CURRICULUM VITAE AND BIBLIOGRAPHY

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Pages 1-9

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CITIZENSHIP: Russia

UNDERGRADUATE EDUCATION: 09/1980-06/1985, Moscow State University, Moscow, Russia

GRADUATE EDUCATION: 11/1985-12/1988, Moscow State University, Moscow, Russia

POSTGRADUATE TRAINING: 03/1995-11/1997, Regensburg University, Regensburg, Germany; 11/2002-11/2003, UT Houston, Medical School, Houston, TX; 07/2007-12/2009, Albert Einstein College of Medicine, the Bronx, NY

ACADEMIC & ADMINISTRATIVE APPOINTMENTS:

11/1985-12/1988: Graduate Student; Laboratory of Dr. O.A. Sineshchekov, Department of Physico-Chemical Biology, School of Biology, Moscow State University, Moscow, Russia

01/1989-08/1989: Research Assistant; Department of Physico-Chemical Biology, School of Biology, Moscow State University, Moscow, Russia

09/1990-12/1992: Graduate Student of UNESCO Training Course in Modern Biology; Laboratory of Dr. L. Keszthelyi, Institute of Biophysics, Biological Research Center, Szeged, Hungary

01/1993-12/1994: Junior Staff Scientist; Department of Physico-Chemical Biology, School of Biology, Moscow State University, Moscow, Russia

01/1995-12/1997: Alexander-von-Humboldt Postdoctoral Fellow; Laboratory of Dr. P. Hegemann, Department of Biochemistry, Regensburg University, Regensburg, Germany

01/1998-12/1999: Junior Staff Scientist; Department of Physico-Chemical Biology,

School of Biology, Moscow State University, Moscow, Russia
01/2000-10/2002: Visiting Scientist; Laboratory of Dr. P. Hegemann, Department of Biochemistry, Regensburg University, Regensburg, Germany
11/2002-12/2003: Postdoctoral Associate; Laboratory of Dr. J.L. Spudich, Department of Microbiology and Molecular Genetics, Medical School, University of Texas Health Science Center - Houston, Houston, TX
01/2004-02/2005: Senior Staff Scientist; Department of Physico-Chemical Biology, School of Biology, Moscow State University, Moscow, Russia
03/2005-05/2005: Visiting Scientist; Laboratory of Dr. U.-G. Maier, Department of Cell Biology, Philipps University, Marburg, Germany
06/2005-11/2006: Senior Staff Scientist; Department of Physico-Chemical Biology, School of Biology, Moscow State University, Moscow, Russia
12/2006-06/2007: Visiting Scientist; Laboratory of Dr. J.L. Rosenbaum, Department of Molecular, Cellular and Developmental Biology, Yale University, New Haven, CT
07/2007-12/2009: Research Fellow; Laboratory of Dr. J.-Y. Sze, Department of Molecular Pharmacology, Albert Einstein College of Medicine, Bronx, NY
01/2010-12/2013: Research Scientist, Laboratory of Dr. J.L. Spudich, Department of Biochemistry and Molecular Biology, Medical School, University of Texas Health Science Center - Houston, Houston, TX
01/2014-present: Assistant Professor; Laboratory of Dr. J.L. Spudich, Department of Biochemistry and Molecular Biology, Medical School, University of Texas Health Science Center - Houston, Houston, TX

PROFESSIONAL ORGANIZATIONS (AND COMMITTEES OF THESE):

LOCAL: 2007-2009: Member, New York Academy of Sciences
NATIONAL: 2006-2008: Member, American Society for Cell Biology
2007-2009: Member, American Society for Neuroscience
2015-present: Member, American Heart Association

HONORS AND AWARDS:

1995: George Soros Foundation Award
1995-1997: Alexander-von-Humboldt Postdoctoral Fellowship
2005: DFG Short-Term Fellowship
2006: Rector's Honor List, M.V. Lomonosov Moscow State University
2006: Alexander-von-Humboldt Follow-Up Fellowship
2006: Alexander-von-Humboldt Institutional Partnership Grant with Dr. M. Mittag, Friedrich Schiller University, Jena, Germany (Co-PI)
2016: Hector Fellow Academy Speakers Award

PUBLICATIONS:

A. Abstracts

1. Sineshchekov O.A., Govorunova E.G., Der A., Keszthelyi L.: Retinal-induced photoelectric responses in *Chlamydomonas reinhardtii* blind mutants. 5th International Conference on Retinal Proteins, Dourdan, France, 1992.
2. Govorunova E.G., Hegemann P.: Time course of dark reactivation of the photoelectric currents in *Chlamydomonas* is determined by the membrane depolarization. 7th International Conference on the Cell and Molecular Biology of *Chlamydomonas*, Regensburg, Germany, 1996.
3. Govorunova E.G., Hegemann P.: Dark reactivation of the photoelectric currents in *Chlamydomonas* is determined by the membrane depolarization. 1st European Phycological Congress, Cologne, Germany, 1996.
4. Govorunova E.G., Hegemann P.: Dependence of photoreceptor and flagellar currents on light pre-excitation in *Chlamydomonas*. The Annual Meeting of Society for Experimental Biology, Lancaster, UK, 1996.
5. Govorunova E.G., Sineshchekov O.A. and Hegemann P.: Desensitization and dark recovery of the photoreceptor current in *Chlamydomonas*. 7th Congress of the European Society for Photobiology, Stresa, Italy, 1997.
6. Sineshchekova O.A., Govorunova E.G., Smirnova E.A., and Sineshchekov O.A.: Activation of receptor currents for phototaxis during the cell transition to the motile state in *Chlamydomonas reinhardtii*. 8th International Conference on the Cell and Molecular Biology of *Chlamydomonas*, Tahoe City, USA, 1998.
7. Govorunova E.G., Sineshchekov O.A., Gärtner W., Chekunova E.M., Chunaev A.S. and Hegemann P.: Restoration of photoelectric currents in "blind" *Chlamydomonas* mutants by retinal and its analogs. 8th International Conference on the Cell and Molecular Biology of *Chlamydomonas*, Tahoe City, USA, 1998.
8. Sineshchekov O., Govorunova E., Pazour G., Witman G., and Nultsch W.: Two photoreceptor currents in photosensory transduction in unicellular flagellates. 42th Annual Meeting of the Biophysical Society, Kansas City, USA, 1998.
9. Sineshchekov O.A., Govorunova E.G., Litvin F.F.: Phototaxis in green flagellate algae. 2nd E.N. Kondratieva Symposium on Phototroph Microorganisms, Moscow, Russia, 2000.
10. Govorunova E.G., Sineshchekov O.A., Gärtner W., Chunaev A.S. and Hegemann P.: Photocurrents and phototactic orientation in *Chlamydomonas* reconstituted with 9-desethyl-retinal. 9th International Conference on Retinal Proteins, Szeged, Hungary, 2000.

11. Govorunova E.G., Sineshchekov O.A., Gärtner W., and Hegemann P.: Photoreceptor currents and phototaxis mediated by an analog chlamyrodopsin containing 9-desmethyl-retinal. 13th International Congress for Photobiology, San Francisco, USA, 2000.
12. Govorunova E.G., Sineshchekov O.A., Gärtner W., Chunaev A.S., Hegemann P.: Photoinduced electrical currents and photoorientation in *Chlamydomonas* cells recorded upon substitution of the native chromophore with 9-demethyl-retinal. 2nd E.N. Kondratieva Symposium on Phototroph Microorganisms, Moscow, Russia, 2000.
13. Sineshchekov O.A. and Govorunova E.G.: Light signal transduction in flagellates as a model system for biomedical research. Humboldtian Conference "Biomedical Sciences", Moscow, Russia, 2001.
14. Govorunova E.G., Altschuler I.M., Sineshchekov O.A.: Detection of water pollution by toxic substances by measuring their influence on photoelectric responses in suspensions of green flagellate algae. 3^d Russian Photobiology Congress, Voronezh, Russia, 2001.
15. Govorunova E.G., Altschuler I.M., Häder D.-P., Sineshchekov O.A.: New express method for detecting toxic substances in water by recording rhodopsin-mediated photoelectric responses in *Chlamydomonas* cell suspensions. 2nd E.N. Kondratieva Symposium on Phototroph Microorganisms, Moscow, Russia, 2001.
16. Govorunova E., Sineshchekov O.A.: Activation of a gamete-specific chemosensory system inhibits the photoreceptor currents in *Chlamydomonas reinhardtii*. 10th International Conference on the Cell and Molecular Biology of *Chlamydomonas*, Vancouver, Canada, 2002.
17. Govorunova E.G., Alexeeva N.V., Sineshchekov O.A.: New express method to detect water pollution: recording photoelectric responses in green flagellate algae. The International Conference "New Technologies of Protection Water Ecosystems Biodiversity", Moscow, Russia, 2002.
18. Sineshchekov O.A., Jung K.-H., Govorunova E.G., and Spudich J.L.: Function of *Chlamydomonas* sensory rhodopsins (CSRA and CSRB) in photomotility responses. The 31th Annual Meeting of the American Society for Photobiology, Baltimore, USA, 2003.
19. Govorunova E.G., Voytsekh O.O., Sineshchekov O.A.: A K⁺ conductance is involved in gamete-specific chemosensory transduction in *Chlamydomonas*. 11th International Conference on the Cell and Molecular Biology of *Chlamydomonas*, Kobe, Japan, 2004.
20. Alexeeva N.V., Govorunova E.G., Sineshchekov O.A.: The role of active and passive processes in *Chlamydomonas* gravitaxis. 3^d Russian Congress of Biophysics, Voronezh, Russia, 2004.

21. Govorunova E.G., Sineshchekov O.A.: New sensory rhodopsins in microorganisms. 4th Russian Photobiology Congress, Voronezh, Russia, 2005.
22. Govorunova E.G., Sineshchekov O.A.: Rhodopsin pigments in phototroph microorganisms. 3^d E.N. Kondratieva Symposium on Phototroph Microorganisms, Moscow, Russia, 2005.
23. Govorunova E.G., Sineshchekov O.A.: Gamete-specific chemical sensing in *Chlamydomonas*. 46th Annual Meeting of the American Society for Cell Biology, San Diego, USA, 2006.
24. Filonova A.P., Govorunova E.G., Sineshchekov O.A.: Chemosensory sensitivity and its relationship with gametogenesis in the green alga *Chlamydomonas reinhardtii*. The International Conference "Molecular, Membrane and Cellular Foundations of Biosystems Function", Minsk, Belarus, 2006.
25. Sineshchekov O.A., Govorunova E.G., Jung K.-H., Zauner S., Maier U.-G., Spudich J.L.: Rhodopsins mediate phototaxis in cryptophyte flagellates. 12th International Conference on Retinal Proteins, Kobe, Japan, 2006.
26. Govorunova E., Sze J.Y.: Genetic dissection of serotonergic inputs to acetylcholine neurotransmission. *C. elegans* Topic Meeting "Neuronal Development, Synaptic Function and Behavior", Madison, USA, 2007.
27. Filonova A.P., Govorunova E.G., Sineshchekov O.A.: Sensitivity to the chemoeffectors tryptone and ammonium, and its changes during gametogenesis in the green flagellate alga *Chlamydomonas reinhardtii*. 6th Congress of the Russian Society for Plant Physiology/The International Conference "Modern Plant Physiology: from Molecules to Ecosystems", Siktivkar, Russia, 2007.
28. Govorunova E.G., Moussaif M., Kullyev A., McDonald T.V., Sze J.Y.: *eat-6* is involved in modulation of excitatory neurotransmission by serotonin. 17th International *C. elegans* Meeting, Los Angeles, USA, 2009.
29. Govorunova E.G., Sineshchekov O.A., Wang J., Spudich J.L.: Intramolecular proton transfers in channelrhodopsins. 15th International Conference on Retinal Proteins, Ascona, Switzerland, 2012.
30. Govorunova E.G. Natural anion channelrhodopsins (ACRs): A new family of light-gated channels and tools for optogenetic neural inhibition. The Lorentz Workshop "Optogenetics: From molecules to applications", Leiden, The Netherlands, 2016.
31. Govorunova E.G., Sineshchekov O.A., Melkonian M., Gane K.-S. Wong, Spudich J.L.: Functional analysis of anion channelrhodopsin homologs from cryptophyte algae. 17th International Conference on Retinal Proteins, Potsdam, Germany, 2016.

B. Refereed Original Articles in Journals

32. Sineshchekov O.A., Govorunova E.G., and Litvin F.F.: Role of the photosynthetic apparatus and stigma in the formation of the spectral sensitivity of phototaxis of flagellate green algae. *Biofizika* 34:255-258, 1989.
33. Sineshchekov O.A., Govorunova E.G., and Litvin F.F.: The rhodopsin-like photoreceptor in *Haematococcus*: hydroxylamine effect on photoelectric responses and phototaxis of cells. *Sensornye Systemy* 5:51-55, 1991.
34. Sineshchekov O.A. and Govorunova E.G.: Rhythmic motor activity of a unicellular flagellate algae and its role in phototaxis. *Biofizika* 36:603-608, 1991.
35. Sineshchekov O.A., Govorunova E.G., Der A., Keszthelyi L. and Nultsch W.: Photoelectric responses in phototactic flagellated algae measured in cell suspension. *J. Photochem. Photobiol. B: Biol.* 13:119-134, 1992.
36. Sineshchekov O.A., Govorunova E.G., Der A., Keszthelyi L., and Nultsch W.: Photoinduced electric currents in carotenoid-deficient *Chlamydomonas* mutants reconstituted with retinal and its analogs. *Biophys. J.* 66:2073-2084, 1994.
37. Govorunova E. G., Der A., Toth-Boconadi R. and Keszthelyi L.: Photosynthetic charge separation in oriented membrane fragments immobilized in gel. *Bioelectrochem. Bioenerg.* 38:53-56, 1995.
38. Lobysheva I.I., Vanin A.F., Sineshchekov O.A. and Govorunova E.G.: Phototaxis in *Chlamydomonas reinhardtii* is modulated by nitric oxide. *Biofizika* 41:538-541, 1996.
39. Govorunova E.G., Sineshchekov O.A. and Hegemann P.: Desensitization and dark recovery of the photoreceptor current in *Chlamydomonas reinhardtii*. *Plant Physiol.* 115:633-642, 1997.
40. Govorunova E.G., Altschuler I.M., Häder D.-P., Sineshchekov O.A.: A novel express bioassay for detecting toxic substances in water by recording rhodospin-mediated photoelectric responses in *Chlamydomonas* cell suspensions. *Photochem. Photobiol.* 72:320-326, 2000.
41. Govorunova, E.G., Sineshchekov, O.A., Gärtner, W., Chunaev, A.S. and Hegemann, P.: Photoreceptor current and photoorientation in *Chlamydomonas* mediated by 9-demethylchlamyrodopsin. *Biophys. J.* 81:2897-2907, 2001.
42. Fuhrmann M., Stahlberg A., Govorunova E.G., Rank S., Hegemann P.: The abundant retinal protein of the *Chlamydomonas* eye is not the photoreceptor for phototaxis and photophobic responses. *J. Cell Sci.* 114:3857-3863, 2001.

43. Govorunova E.G., Sineshchekov O.A.: Integration of photo- and chemosignaling pathways in *Chlamydomonas*. *Planta* 21:535-540, 2003.
44. Govorunova E.G., Jung K.-H., Sineshchekov O.A., and Spudich, J.L.: *Chlamydomonas* sensory rhodopsins A and B: cellular content and role in photophobic responses. *Biophys. J.* 86:2342-2349, 2004.
45. Sineshchekov O.A., Govorunova E.G., Jung K.-H., Zauner S., Maier U.-G., Spudich J.L.: Rhodopsin-mediated photoreception in cryptophyte flagellates. *Biophys. J.* 89:4310-4319, 2005.
46. Govorunova E.G., Voytsekh O.O., Sineshchekov O.A.: Changes in photoreceptor currents and their sensitivity to the chemoeffector tryptone during gamete mating in *Chlamydomonas reinhardtii*. *Planta* 225:441-449, 2007.
47. Sineshchekov O.A., Govorunova E.G., Spudich J.L.: Photosensory functions of channelrhodopsins in native algal cells. *Photochem. Photobiol.* 85:556-563, 2009.
48. Govorunova E.G., Moussaif M., Kullyev A., Nguyen K.C.O., McDonald T.V., Hall D.H., Sze J.Y.: A homolog of FHM2 is involved in modulation of excitatory neurotransmission by serotonin in *C. elegans*. *PLOS One* 5:e10368, 2010.
49. Govorunova E.G., Spudich E.N., Lane C.E., Sineshchekov O.A., Spudich J.L.: New channelrhodopsin with a red-shifted spectrum and rapid kinetics from *Mesostigma viride*. *MBio* 2:e00115-11, 2011.
50. Sineshchekov O.A., Govorunova E.G., Wang J., Spudich J.L.: Enhancement of the long-wavelength sensitivity of optogenetic microbial rhodopsins by 3,4-dehydroretinal. *Biochemistry* 51:4499-4506, 2012.
51. Hou S.Y., Govorunova E.G., Ntefidou M., Lane C.E., Spudich E.N., Sineshchekov O.A., Spudich J.L.: Diversity of *Chlamydomonas* channelrhodopsins. *Photochem. Photobiol.*, 88, 119-128, 2012.
52. Govorunova E.G., Sineshchekov O.A., Li H., Janz R., Spudich J.L.: Characterization of a highly efficient blue-shifted channelrhodopsin from the marine alga *Platymonas subcordiformis*. *J. Biol. Chem.* 288:29911-29922, 2013.
53. Sineshchekov O.A., Govorunova E.G., Wang J., Li H., Spudich J.L.: Intramolecular proton transfer in channelrhodopsins. *Biophys. J.* 104:807-817, 2013.
54. Li H., Govorunova, E.G., Sineshchekov, O.A., and Spudich, J.L.: Role of a helix B lysine residue in the photoactive site in channelrhodopsins. *Biophys. J.* 106:1607-1617, 2014.
55. Govorunova, E.G., Sineshchekov, O.A., Liu, X., Janz, R., and Spudich, J.L.:

- Natural light-gated anion channels: A family of microbial rhodopsins for advanced optogenetics. *Science* 349(6248):647-650, 2015.
56. Sineshchekov O.A., Li H., Govorunova E.G., Spudich J.L. Gating mechanisms of a natural anion channelrhodopsin. *Proc. Natl. Acad. Sci. USA* 112:14236-14241, 2015.
 57. Sineshchekov O.A., Govorunova E.G., Li H., Spudich J.L. Photochemical reaction cycle transitions during anion channelrhodopsin gating. *Proc. Natl. Acad. Sci. USA* 113:E1993-2000, 2016.
 58. Govorunova E.G., Sineshchekov O.A., Spudich J.L. Structurally distinct cation channelrhodopsins from cryptophyte algae. *Biophys. J.* 110:2302-2304, 2016.
 59. Govorunova E.G., Cunha S.R., Sineshchekov O.A., Spudich J.L. Anion channelrhodopsins for inhibitory cardiac optogenetics. *Sci. Rep.* 6:33530, 2016.
 60. Govorunova E.G., Sineshchekov O.A., Rodarte E.M, Janz R., Morelle O., Melkonian M., Wong G.-K., Spudich J.L. The expanding family of natural anion channelrhodopsins reveals large variations in kinetics, conductance, and spectral sensitivity. *Sci. Rep.* 7:43358, 2017.
- C. Invited Articles (Reviews, Editorials, etc.) in Journals
61. Sineshchekov O.A. and Govorunova E.G.: Rhodopsin-mediated photosensing in green flagellated algae. *Trends in Plant Sci.* 4:58-63, 1999.
 62. Sineshchekov O.A.; Sudnitsin V.V.; Govorunova E.G., and Litvin F.F.: Rhythmic activity in the green flagellated alga *Haematococcus pluvialis* and its role in regulation of cell motility. *Biologicheskije Membrany* 18:83-91, 2001.
 63. Sineshchekov O.A. and Govorunova E.G.: Rhodopsin receptors of phototaxis in green flagellate algae. *Biochemistry (Mosc.)*. 66:1609-1622, 2001.
 64. Govorunova E.G., Jung K.-H., Sineshchekov O.A.: Rhodopsin-mediated photomotility in *Chlamydomonas* and related algae. *Biofizika* 49:278-293, 2004.
 65. Govorunova E.G., Sineshchekov O.A.: Chemotaxis in the green flagellate alga *Chlamydomonas*. *Biochemistry (Mosc.)*, 70:869-978, 2005.
 66. Spudich J.L., Sineshchekov O.A., Govorunova E.G.: Mechanism divergence in microbial rhodopsins. *Biochim. Biophys. Acta*, 1837:546-552, 2014.
 67. Govorunova E.G., Koppel L.A. The road to optogenetics: Microbial rhodopsins. *Biochemistry (Mosc.)*. 81:928-940, 2016.
 68. Govorunova E.G., Sineshchekov O.A., Li H., Spudich J.L. Microbial rhodopsins: Diversity, mechanisms, and optogenetic applications. *Annu. Rev.*

Biochem. 86:845-872, 2017.

D. Chapters

69. Sineshchekov O.A., Govorunova E.G., Der A., Keszthelyi L.: Retinal-induced photoelectric responses in *Chlamydomonas reinhardtii* "blind" mutants. In: Structure and Functions of Retinal Proteins. Ed. J.L. Rigaud, John Libbey Eurotext, v. 221, pp. 343-346, 1992.
70. Sineshchekov O.A. and Govorunova E.G.: Electrical events in photomovements of green flagellated algae. In: Comprehensive Series in Photosciences, v.1 Photomovements. Eds. D.-P. Häder and M. Lebert, Elsevier Science, Amsterdam, pp. 245-280, 2001.
71. Govorunova E.G. and Sineshchekov O.A.: Regulation of cellular behaviour by external stimuli in *Chlamydomonas* and related green alga. Recent Research Developments in Plant Physiology, v. 2 (S.G. Pandalai, ed.), Research Signpost, Trivandrum, pp. 79-93, 2001.
72. Govorunova, E.G., Voytsekh, O.O., Filonova, A.P., Kutuzov, M.A., Mittag, M., Sineshchekov, O.A.: Chemotaxis in the model organism *Chlamydomonas reinhardtii*. In Chemotaxis: Types, Clinical Significance, and Mathematical Models (T.C. Williams, ed.), Nova Publishers, Hauppauge, pp. 135-156, 2011.