

Oleg Moskvina, PhD

Position: Senior Visiting Scientist, Department of Biostatistics and Medical Informatics, University of Wisconsin-Madison and Research Scientist, Department of Obstetrics and Gynecology, Medical College of Wisconsin, Milwaukee, WI

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US Status: Permanent Resident

Research Direction

Integration of advanced analysis of high-throughput genomic data with classical biochemistry / molecular biology approaches to decipher regulatory mechanisms in biological systems.

Professional Experience

- 2010 – Visiting Research Scientist, Senior Visiting Scientist, Lab. of Prof. Christina Kendziorski, Department of Biostatistics and Medical Informatics, University of Wisconsin-Madison and Research Scientist, Department of Obstetrics and Gynecology, Medical College of Wisconsin, Milwaukee, WI
- 2002-2010 Postdoctoral Fellow, Research Scientist, Senior Research Scientist, Lab. of Prof. Mark Gomelsky, Dept. of Molecular Biology, University of Wyoming, Laramie, WY, USA
- 2001-2002 Postdoctoral Fellow, Kresge Eye Institute, Wayne State University, Detroit MI
- 2000-2001 Visiting Scientist (short-term research project), Lab. of Prof. Goran Samuelsson, Department of Plant Physiology, Umea University, Umea, Sweden.
- 1990-2001 Research Assistant, Junior Research Scientist, Research Scientist. Institute of Basic Biological Problems, Russian Academy of Sciences.

Education

- PhD (2000) Biological Sciences. Moscow State University, Biology Department, Moscow, Russia. www.msu.ru/en/
- MSc Biology and Chemistry. Department of Biology and Chemistry, Mari State University. *Summa cum laude*.

Early and Recent Training in Natural and Formal Sciences

- (Postdoctoral) Advanced Bioinformatics, University of Wisconsin-Madison
- (Postdoctoral) Computational Biology, University of Wyoming
- (High school) Extramural School on Chemistry (for advanced high school students), Kazan State University, www.ksu.ru/eng graduated with an honours degree.
- (High school) Extramural School on Physics and Mathematics (for advanced high school students), Moscow Institute of Physics and Technology www.phystech.edu

Cumulative citations of research papers: 504 in 381 articles (ISI, 11/15/2011)

Publications

Peer-reviewed publications.

1. Tsuzuki M., **Moskvin O.V.**, Kuribayashi M., Sato K., Retamal S., Abo M., Zeilstra-Ryalls J. and Gomelsky M. (2011) Salt-stress induced changes in the transcriptome, compatible solutes, and membrane lipids in the facultatively phototrophic bacterium *Rhodobacter sphaeroides*. *Appl. Environ. Microbiol.* 77: 7551-7559
2. **Moskvin O.V.**, Bolotin D., Wang A., Ivanov P.S. and Gomelsky M. (2011) Rhodobase, a Meta-analytical Tool for Reconstructing Gene Regulatory Networks in a Model Photosynthetic Bacterium. *Biosystems* 103: 125-131
3. Ryu M.-H., **Moskvin O.V.**, Siltberg-Liberles J. and Gomelsky M. (2010) Natural and Engineered Photoactivated Nucleotidyl Cyclases for Optogenetic Applications. *J. Biol. Chem.* 285: 41501-41508

Recommended by Faculty of 1000 (Cell Biology)
Bas Orth C, Bading H: 2010. F1000.com/6543956

4. **Moskvin O.V.**, Gilles-Gonzalez M.-A. and Gomelsky M. (2010) The PpaA/AerR regulators of photosynthesis gene expression from anoxygenic phototrophic proteobacteria contain heme-binding SCHIC domains. *Journal of Bacteriology* 192: 5253–5256
5. Gomelsky L., **Moskvin O.V.**, Stenzel R.A., Jones D.F., Donohue T.J. and Gomelsky M. (2008) Hierarchical regulation of photosynthesis gene expression by the oxygen-responsive PrrBA and AppA-PpsR systems of *Rhodobacter sphaeroides*. *Journal of Bacteriology* 190: 8106-8114
6. **Moskvin O.V.**, Kaplan S., Gilles-Gonzalez M.A. and Gomelsky M. (2007) Novel type of heme-based oxygen sensor with a revealing evolutionary history. *J. Biol. Chem.* 282: 28740-28748

Recommended by Faculty of 1000 (Chemical Biology)
Matthews R: 2007. F1000.com/1092051

7. Zeller T., Mraheil M.A., **Moskvin O.V.**, Li K., Gomelsky M. and Klug G. (2007) Regulation of hydrogen peroxide-dependent gene expression in *Rhodobacter sphaeroides*: Regulatory functions of OxyR. *Journal of Bacteriology* 189:3784-3792
8. Zeller T., **Moskvin O.V. (co-first author)**, Li K., Klug G. and Gomelsky M. (2005) Transcriptome and physiological responses to hydrogen peroxide of the facultatively phototrophic bacterium *Rhodobacter sphaeroides*. *Journal of Bacteriology* 187: 7232-7242
9. **Moskvin O.V.**, Gomelsky L. and Gomelsky M. (2005) Transcriptome analysis of the *Rhodobacter sphaeroides* PpsR regulon: PpsR as master regulator of photosystem development. *Journal of Bacteriology* 187: 2148-2156
10. Ryjenkov D., Tarutina M., **Moskvin O.V.** and Gomelsky M. (2005) Cyclic Diguanylate Is a Ubiquitous Signaling Molecule in Bacteria: Insights into Biochemistry of the GGDEF Protein Domain. *Journal of Bacteriology* 187: 1792-1798
11. Braatsch S., **Moskvin O.V. (co-first author)**, Klug G., and Gomelsky M. (2004) Responses of the *Rhodobacter sphaeroides* transcriptome to blue light under semiaerobic conditions. *Journal of Bacteriology* 186: 7726–7735

12. Pappas, C.T., Sram J., **Moskvin O.V.**, Ivanov P.S., Mackenzie R.C., Choudhary M., Land M.L., Larimer F.W., Kaplan S. and Gomelsky M. (2004). Construction and validation of the genome-wide DNA microarray of *Rhodobacter sphaeroides* 2.4.1: transcriptome flexibility at diverse growth modes. *Journal of Bacteriology* 186: 4748-4758
13. **Moskvin O.V.**, Shutova T.V., Khristin M.S., Ignatova L.K., Villarejo A., Samuelsson G. Klimov V.V. and Ivanov B.N. (2004) Carbonic Anhydrase Activities In Pea Thylakoids: A Photosystem II Core Complex-Associated Carbonic Anhydrase. *Photosynthesis Research* 79: 93-100
14. Gomelsky L., Sram J., **Moskvin O.V.**, Horne I.M., Dodd H.N., Pemberton J.M., McEwan A.G., Kaplan S., Gomelsky M. (2003) Identification and in vivo characterization of PpaA, a regulator of photosystem formation in *Rhodobacter sphaeroides*. *Microbiology* 149: 377-88
15. Yamazaki A., **Moskvin O.**, Yamazaki R.K. (2002) Phosphorylation by cyclin-dependent protein kinase 5 of the regulatory subunit (Pgamma) of retinal cGMP phosphodiesterase (PDE6): its implications in phototransduction. *Adv Exp Med Biol.* 514: 131-53. (Review)
16. Villarejo A., Shutova T., **Moskvin O.**, Forssen M., Klimov V., Samuelsson G. (2002) A photosystem II-associated carbonic anhydrase regulates the efficiency of photosynthetic oxygen evolution. *EMBO Journal* 21: 1930-1938
17. Ignatova LK, **Moskvin OV**, Ivanov BN (2001) Effects of carbonic anhydrase inhibitors on proton exchange and photosynthesis in pea protoplasts. *Russian Journal of Plant Physiology* 48: 467-472
18. **Moskvin O.V.**, Ivanov B.N., Ignatova L.K., Kollmeier M.A. (2000) Light-induced stimulation of carbonic anhydrase activity in pea thylakoids. *FEBS Lett.* 470: 375-377.
19. Ignatova L.K., **Moskvin O.V.**, Romanova A.K., Ivanov B.N., (1998) Carbonic anhydrases in the C3 plant leaf cell. *Aust. J. Plant Physiol.* 25: 673-678.
20. **Moskvin O.V.**, Novichkova N.S., Ivanov B.N. (1998) Induction of chlorophyll *a* fluorescence in clover leaves grown at varying nitrogen supply and irradiance levels. *Russian Journal of Plant Physiology* 45: 353-358.
21. **Moskvin O.V.**, Ovchinnikova V.I. and Ivanov B.N. (1996) The effect of light on the carbonic anhydrase activity of pea thylakoids. *Biofizika (Biophysics)* 41: 1067-1072.
22. **Moskvin O.V.**, Ignatova L.K., Ovchinnikova V.I. and Ivanov B.N. (1995) Membrane-associated carbonic anhydrase of pea thylakoids. *Biochemistry (Moscow)* 60: 859-864
23. Ignatova L.K., **Moskvin O.V. (corresponding author)**, Ivanov B.N. and Romanova A.K. (1993) The effect of CO₂ uptake by pea protoplasts on O₂ evolution rate and parameters of chlorophyll fluorescence quenching. *Plant Physiol. Biochem*, 31: 295-301.

Book chapters and book reviews.

24. **Moskvin O.V.** (2011) Review on: “A Practical Guide to Scientific Data Analysis” by D. Livingstone, *The American Statistician* 65 (2): 138.
25. **Moskvin O.V.**, Ignatova L.K., Ivanov B.N. (1999) Uncoupler-sensitive light-induced stimulation of carbonic anhydrase activity of pea thylakoids. *in: Photosynthesis: Mechanism and Effects (Garab, G., Ed.), Vol. II, pp. 1205-1208, Kluver AP, Dordrecht.*
26. **Moskvin O.V.**, Razguljajeva A.Y., Shutova T.V , Khristin M.S., Ivanov B.N., Klimov V.V.

(1999) Carbonic anhydrase activity of different Photosystem II preparations. *in: Photosynthesis: Mechanism and Effects* (Garab, G., Ed.), Vol. II, pp. 1201–1204, Kluwer AP, Dordrecht.

Invited Presentations on Transcriptomics

- 2010 Guest Lecture on Microarray Meta-Analysis, “Computational Approaches to Analyzing Microarray Data” course, BioPharmaceutical Technology Center Institute (Promega campus), Madison, WI
- 2005 5th Annual Northwest Gene Expression Conference, Seattle, WA
- 2003 11th International Symposium on Phototrophic Prokaryotes, Tokyo, Japan

Teaching Experience

- 2008 Guest Lectures in Biochemistry. MOLB3610/CHEM3610. University of Wyoming.
- 2004-2008 Guest Lectures and Labs in Microbial Gene Expression MOLB4051/ 5051. University of Wyoming.
- 2005 Guest Lectures in Microbial Physiology & Metabolism. MOLB 4460/ 5460 University of Wyoming.
- 1998 Guest Lectures “*Chlorophyll a fluorescence as a tool to monitor energy transduction in thylakoid membrane*”. Photobiology Department, Pushchino State University, Pushchino Biological Research Center, Russia.

Supervisory Experience

- 2008 Dmitry Bolotin (undergraduate, Dept. Of Physics, Moscow State University). Project: RHODOBASE.ORG: Analytical database of *Rhodobacter sphaeroides* transcriptional regulation.
- 2007 Maureen Yu (undergraduate, Amherst College). Project: “Prediction of sRNA genes in *Rhodobacter sphaeroides*”. Wyoming Summer Undergraduate Bioinformatics Research Program.
- 2005 Andrew Wang (high school minority student). Project: “Gene Hunting: Search for Unknown Genes in *Rhodobacter sphaeroides*”. Summer Research Apprenticeship Program at the University of Wyoming. *The Best Presentation Award*.
- 2003-2005 Supervised variety of scholars from different institutions worldwide in collaborative projects on transcriptomics: Min Hyan Ryu (Graduate student, Sogang University, S. Korea), Minoru Tsuzuki (Graduate student, University of Tokyo, Japan), Dr. R. Liz Sockett (Professor in Genetics, University of Nottingham, UK), Dr. Jill Zeilstra-Ryalls (Associate Professor, Oakland University), Stephan Braatsch (Postdoc, Universitat Giessen, Germany).
- 1998 Michelle Kollmeier (a US exchange student). Project: “Thylakoid carbonic

anhydrase and the light reactions of photosynthesis”. Institute of Basic Biological Problems, Pushchino, Russia. This work has been awarded a *gold medal* in the Saint John’s Science Symposium.

Awards

- As researcher: Sponsored AAAS membership (AAAS/Science Program for Excellence in Science); Robert Havemann scholarship for young scientists (Germany)
- As student: USSR Student Biology Olympiad (Ashgabat, USSR): represented Russian Federation (among 4 persons) and won the theoretical part of the Olympiad.
- As high school student: Solo winner of the Mari El Republic Chemistry Olympiad during all the 3 applicable years.

Memberships

- American Association for the Advancement of Science (AAAS)
- International Society for Computational Biology (ISCB)

Miscellaneous services

- 2011 Expert Panel Member,
Russian Governmental Initiative on attracting leading scientists to the Russian institutions of higher education (“The Megagrant Program”) (<http://eng.mon.gov.ru/pro/ved/uch/>). The amount of funding awarded to each individual project was equivalent to \$5,000,000