

Maria Bykhovskaia
CURRICULUM VITAE

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EDUCATION:

1987 M.S. Physics.
Leningrad Technical University, St. Petersburg, Russia.

1992 Ph.D. Biophysics. Advisor Boris Zhorov
Russian Academy of Sciences, St. Petersburg, Russia.

PROFESSIONAL APPOINTMENTS:

1987-1997 Sechenov Institute of Evolutionary Physiology & Biochemistry,
Russian Academy of Sciences, St. Petersburg, Russia
1995, Research Scientist
1992, Junior Scientist

1991 Institute of Physical Chemistry and Biochemistry,
Visiting Scholar, Lab of Richard Lavery. Paris, France

1993 Society of Mathematics and Information (GMD),
Visiting Scientist, Lab of Prof. Lengauer. St-Augustin, Germany.

1994- 2002 University of Virginia, Dept Molecular Physiology & Biological Physics.
2000, Assistant Professor of Research
1997, Instructor of Research
1994, Research Associate, Lab of John T. Hackett.

2002-present Lehigh University, Dept. Biological Sciences, Assistant Professor

AREA OF RESEARCH SPECIALIZATION:

Synaptic physiology. Computational Neuroscience. Electrophysiology. Confocal imaging.
Mathematical and Computational Biology. Molecular modeling. Scientific programming.

GRANT SUPPORT:

1996-1999	NSF, "Statistical analysis and computer simulations of persistent neurosecretory activity", PI John T. Hackett, Co-PI M.Bykhovskaia. Total costs \$99,703.
1997-2000	NIH, Fogarty International Collaboration Research Award "Hormonal regulation of presynaptic release mechanisms", PI Mary Kate Worden, Co-PI M.Bykhovskaia. Total direct costs \$56,227.
1998-2000	NSF, POWRE Research Award "Supplement: Refractory period for quantal neurosecretion", PI M.Bykhovskaia. Total costs \$49,498.
1998-1999	U.S. Army Research Office. "Theoretical analysis of DNA low-frequency phonon modes", PI M.Bykhovskaia. Total costs \$69,785.
1998-2001	Jeffress Trust. "Mechanisms underlying time-course of transmitter release", PI M.Bykhovskaia. Total direct costs \$50,000.
2000-2001	U.S. Army Research Office. "DNA low-frequency internal vibrations: spectroscopy and normal mode analysis", PI M.Bykhovskaia. Total costs \$150,000.
2000-2004	NIH 1 R01 MH61059-01. "Quantitative study of facilitated neurosecretion", PI M.Bykhovskaia. Total costs \$970,280.
2001-2005	Department of Defense, Multidisciplinary University Research Initiative (MURI), "The Science and Technology of Terahertz Bio/Chem Detection", PI Thomas W. Crow, Co-PI M. Bykhovskaia. Total costs \$ 1,200,000 per year.

PUBLICATIONS

1. Savelyev A.N., **Tsendina M.B.***, Firsov L.M. (1987) On the absence of multiple attack of the oligomeric substrate by glucoamilase from *Asprgillus awamori*. *Biochimia*. 50: 1743-1748

* Maiden name

2. Levchenko V.F, Menshutkin V.V., **Tsendina M.B.** (1988) Computer simulation of macroevolution. in: Mathematical modeling of complicated biological systems. The X Soviet Symposium. Molchanov (ed.). Nauka, Moscow. Pp 64-79. (Russian).

3. **Tsendina M.B.**, Frishman D.I., Levchenko V.F., Berman A.L. (1989) On the similarity of the primary structure and homology between rhodopsin, β -adrenoreceptor and muscarinic cholinoreceptor. *J. Evolutionary Biochemistry & Physiology*. 24: 600-609.

4. **Tsendina M.B.**, Rozengart E.V., Gribakin F.G., Zhorov B.S. (1990) Comparison of conformations of American cockroach sex pheromone Periplanone A and its mimic Germacrene D. *Sensory Systems*. 3 : 173-179.

5. **Bykhovskaia M.B.**, Zhorov B.S. (1990) Conformations of American cockroach sex pheromone and its mimic. in: Sensory Systems and Communication in Arthropods. Birkhauser Verlag Basel. Pp 16-19.

- 6. Bykhovskaia M.B.,** Zhorov B.S., Kraevskaja M.A., Zinkevich E.P. (1991) A model of osmic receptor of monocyclic analogs of 5-a-androst-16-en-3-on. in: Problems of Chemical Communication in Animals. Lavrenko (ed). Nauka, Moscow. Pp 312-317. (Russian).
- 7. Bykhovskaia M.B.,** Zhorov B.S., Zinkevich E.P. (1992) Spatial structure and odor of 5a-androst-16-ene-3-one and its monocyclic analogs. *Sensory Systems*. 5: 261-268.
- 8. Zinkevich E.P.,** Aronov E.V., Kagan M.Z., Gulevich U.V., Kraevskaja M.A., Vasilieva V.S., **Bykhovskaia M.B.,** Zhorov B.S. (1993) The odor-structure relationship in series of 5a-androst-16-en-3-one analogs. *Sensory Sistems*. 6: 115-119.
- 9. Bykhovskaia M.,** Minor A., Zhorov B. (1993) An atomic model of the receptor recognition site of *Eurigaster Integriceps* sex pheromone. *Sensory Systems of Arthropods*. Birkhauser Verlag Basel. Pp 448-453.
- 10. Bykhovskaia M.,** Zhorov B. (1993) Conformation-activity relationships of *Periplaneta americana* sex pheromones and their analogs. in: *Sensory Systems of Arthropods*. Birkhauser Verlag Basel. Pp 454-461.
- 11. Bykhovskaia M.B.** (1996) An atomic model of the recognition site of the receptor of the sex pheromone of American cockroach. *Sensory sistems*. 8(2-3): 5-14.
- 12. Bykhovskaia M.B.,** Zhorov B.S. (1996) Atomic model of the recognition site of American cockroach pheromone receptor. *J.Chem.Ecol.* 22:869-882
- 13. Bykhovskaia M.,** Worden M.K., Hackett J.T. (1996) An algorithm for high-resolution detection of postsynaptic quantal events in extracellular records. *J.Neurosci.Methods*. 65: 173-182.
- 14. Worden M.K., Bykhovskaia M.,** Hackett J.T. (1997) Facilitation at the lobster neuromuscular junction: a stimulus-dependent mobilization model. *J. Neurophysiol.* 78: 417-428.
- 15. Bykhovskaia M.,** Hackett J.T., Worden M.K. (1999) Asynchrony of quantal events in evoked multiquantal responses. *J. Neurophysiol.* 81:2234-2242.
- 16. Bykhovskaia M.,** M.K.Worden, and J.T. Hackett. (1999) Presynaptic facilitation: quantal analysis and simulations. *Neurocomputing* 26-27 : 9-15.
- 17. Vorobieva O.N.,** J.T. Hackett ., M.K.Worden, **M. Bykhovskaia.** (1999). Evaluation of quantal neurosecretion from evoked and miniature postsynaptic responses by deconvolution method. *J. Neurosci. Methods* . 92:91-99.
- 18. Globus T.R.,** D.L.Woolard, **M.Bykhovskaia,** B.Gelomont, J.L.Hesler, T.W.Crow,

A.C.Samuels (1999). FTIR-Spectroscopic characterization of DNA macromolecules. Proceedings of 1999 International Semiconductor Device Research Symposium, Charlottesville, 1999. Pp. 485-488.

19. Bykhovskaia M., Worden M.K., Hackett J.T. (2000) Stochastic modeling of facilitated neurosecretion. *J. Comput. Neurosci.* 8:113-126.

20. Bykhovskaia M., B.Gelomont, T.R. Globus, D.L.Woolard, A.C.Samuels, T. Ha-Duong, K.Zakzewska. (2001) Calculations of DNA low-frequency absorption spectra. *Theoretical Chemistry Accounts.* 106:22-27.

21. Bykhovskaia M., E. Polagaeva. J.T.Hackett. (2001) Hyperosmolarity reduces facilitation by a Ca^{2+} independent mechanism: possible depletion of the releasable pool. *J. Physiol. Lond.* 537: 179-190.

22. Globus T. R., D. L. Woolard, A. C. Samuels, B. L. Gelmont, J. Hesler, T. W. Crowe and **M. Bykhovskaia.** (2002) Submillimeter-wave transform spectroscopy of biological macromolecules. *J. Applied Physics.* 91:8105-8113.

23. Globus T.R., **M. Bykhovskaia**, B.Gelmont, and D.L. Woolard. (2002) Far-infrared phonon modes of selected RNA molecules. in R.L. Spellicy (Ed.) Proceedings of SPIE. V. 4574, Pp. 119-128.

24. Bykhovskaia M., E. Polagaeva. J.T.Hackett. (2002). Effect of Ca^{2+} on presynaptic facilitation. *Neurocomputing.* 44-46: 1-4.

25. Woolard D. L., Globus T. R., B. L. Gelmont, **M. Bykhovskaia**, C. Samuels, D. Cookmeyer, J. Hesler, T. W. Crowe, J.O. Jensen, I.L. Jensen, and W.R.Laerop. (2002) Submillimeter-wave phonon modes in DNA macromolecules. *Phys. Rev. E.* 65:051903.

26. Globus T. R. , D. L. Woolard, T. Khromova, T. W. Crowe, **M. Bykhovskaia**, B. L. Gelmont, J. Hesler, and A. C. Samuels. 2003. Thz-Spectroscopy of Biological Molecules. *Journal of Biological Physics.* 29: 89-100.

27. T.Globus, **M.Bykhovskaia**, D.Woolard, B.Gelmont. 2003. Sub-millimeter wave absorption spectra of artificial RNA molecules. *Journal of Physics D: Applied Physics.* 36:1314-1322.

28. Bykhovskaia M. and E. Polagaeva. (2004) Increase in the releasable pool of synaptic vesicles underlies facilitation. *Neurocomputing.* 58-60C : 469-476.

29. Bykhovskaia M., E. Polagaeva, and J.T.Hackett. (2004). Mechanisms underlying different facilitation forms at the lobster neuromuscular synapse. *Brain Research* 1019:10-21.