

Andriy Anishkin, Ph.D.

Curriculum Vitae

Address

Work	Home
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Education

- 1999.** Ph.D.(Candidate of Sciences) in Biophysics. Biology Research Institute of Kharkov National University, Kharkov, Ukraine.
Thesis: "Mathematical description and computer analysis of proton-chemical and chemiosmotic mechanisms of energy coupling"
- 1994.** M.Sc. in Biophysics, 1st Class Honors Degree, Kharkov National University, Kharkov, Ukraine.
Thesis: "Regulation of the inner membrane permeability in the dynamics of large-scale mitochondria swelling"

Research Experience

- 1991 - 1994.** Undergraduate Research Assistant. Molecular and Applied Biophysics Department, Kharkov National University, Kharkov, Ukraine.
- 1994 - 1995.** Graduate research assistant at General and Medical Biophysics Department, Fundamental Medicine Faculty, Kharkov National University, Kharkov, Ukraine.
Research area: Mitochondrial permeability transition pore.
Methods used: Optical methods of mitochondria swelling registration, Fluorescent spectroscopy of pyridine nucleotides contents, Polarographic measurement of mitochondria respiration rate, Differential spectroscopy of mitochondrial cytochromes, Methods of continuous change of media composition.
- 1994 - 1997.** Post-Graduate in Biophysics. Kharkov National University, Kharkov, Ukraine.
- 1995 - 2000.** Research Fellow. Membrane Biophysics Department. Biology Research Institute of Kharkov National University, Kharkov, Ukraine.
Research area: Energy coupling mechanism in biological membranes (theoretical study).
Methods used: Metabolic control analysis methods, Equivalent electric circuits method, Mathematical models creation and analysis in MathCAD, Programming, models analysis and optimization in Q-basic, Pascal, Visual Basic, MatLab. Databases creation in MS Access 97 - 2000.
- 2000 - 2003.** Faculty Research Assistant. Department of Biology, University of Maryland, College Park, MD, US.
Research area: Molecular mechanism of mechanosensation in MscL and

MscS channels.

Methods used: Site-directed mutagenesis, gel electrophoresis, patch-clamp recording and analysis of channel activity, kinetics analysis, software development (MatLab)

2003 - present. Faculty Research Associate. Department of Biology, University of Maryland, College Park, MD, US.

Research area: Molecular mechanism of mechanosensation in MscL and MscS channels.

Methods used: Channel kinetics and thermodynamics analysis, molecular dynamics simulations, software development for molecular structure and dynamics analysis (MatLab, Tcl/Tk)

Teaching Experience

1995. Lecturer in bioenergetics at the Faculty of Fundamental Medicine of Kharkov National University, Kharkov, Ukraine.

Honors and Awards

1991, 1992, 1993. The winner of a contest of students term papers at Molecular and Applied Biophysics Department, Kharkov National University, Kharkov, Ukraine.

1992. Alexander S. Popov scholarship winner.

Membership

- Biophysical Society (US)
- Ukrainian Biochemical Society
- Ukrainian Society of Gerontologists and Geriatrists

Research Interests

- Molecular mechanisms of membrane channels mechanosensation
- Molecular dynamics simulations of large-scale conformational transitions in proteins
- Protein-lipid interactions in membrane channels
- Structure and dynamics of ceramide pores in lipid bilayers and mitochondrial membranes
- Mechanism and regulation of permeability transition pore generation in the inner mitochondrial membrane
- Energy coupling mechanisms, mathematical modeling of energy coupling systems

Publications

Papers

1. Sukharev S, Anishkin A. Explicit channel conductance: can it be computed? 2005 Biophys J. Mar 11; [Epub ahead of print] Review.
2. Anishkin A, Chiang CS, Sukharev S. 2005 Gain-of-function Mutations Reveal Expanded Intermediate States and a Sequential Action

- of Two Gates in MscL.
J Gen Physiol. 125(2):155-170.
3. Akitake B, Anishkin A, Sukharev S. 2005
The "Dashpot" Mechanism of Stretch-dependent Gating in MscS.
J Gen Physiol. 125(2):143-154.
 4. Sukharev S, Anishkin A. 2004.
Mechanosensitive channels: what can we learn from 'simple' model systems?
Trends Neurosci. 27(6):345-351. Review.
 5. Anishkin A, Sukharev S. 2004.
Water dynamics and dewetting transitions in the small mechanosensitive channel MscS.
Biophys J. 86(5):2883-2895.
 6. Chiang CS, Anishkin A, Sukharev S. 2004.
Gating of the large mechanosensitive channel in situ: estimation of the spatial scale of the transition from channel population responses.
Biophys J. 86(5):2846-2861.
 7. Anishkin A, Gendel V, Sharifi NA, Chiang CS, Shirinian L, Guy HR, Sukharev S. 2003.
On the conformation of the COOH-terminal domain of the large mechanosensitive channel MscL.
J Gen Physiol. 121(3):227-244.
 8. Anishkin AG. 1998
Mathematical Modeling of the Part of Mitochondrial Respiratory Chain in Frames of Proton-Chemical Hypothesis.
Dop. Nacion. Akad. Nauk. Ukr., - N5, - p. 183-189. (In Russian)
 9. Anishkin AG, Lemeshko VV. 1998
Theoretical Dependence of Phosphate Potential on Magnitude of Protonmotive Force for Two-Electron Proton-Chemical Coupling Point Model.
Visnik Harkivskogo Universitetu N422. Biofizichnyi visnik, v. 2. -p. 74-77. (In English)
 10. Lemeshko VV, Anishkin AG. 1998
The Mathematical Modeling of Energy Coupling In Mitochondria in Frames of Proton-Chemical Hypothesis.
Biofizika, - N 2, - p. 308-314. (In Russian)
 11. Anishkin AG. 1997
Modeling of Combination of Proton-Chemical and Chemiosmotic Energy Coupling Mechanisms by Method of Equivalent Electric Circuits.
Biologicheskii vestnik, - v.1, N1, - p.107-111. (In Russian)
 12. Lemeshko VV, Anishkin AG. 1996
The Mathematical Modeling of Proton-Chemical Point of Coupling of ATP Synthesis with Electronic Transport in Biomembranes.
School of Fundam. Medicine Journal, - V. 2, N2, - P. 4-9. (In English)

Papers in press

1. Sukharev S, Anishkin A, Chiang CS, Betanzos M, Guy HR
MscL, a bacterial mechanosensitive channel

Book chapter in “Bacterial ion channels and eukaryotic homologues”, Ed. Andrzej Kubalski, Boris Martinac. American Society for Microbiology Press, June 2005

Papers in preparation

2. Anishkin A, Sukharev S, Colombini M.
Searching for the Molecular Arrangement of Transmembrane Ceramide Channels
3. Anishkin A, Sukharev S.
Pore Size-Dependent Dewetting in the Hydrophobic Gate Region of Acetylcholine Receptor Channel.

Conference Presentations

1. S Sukharev*, B Akitake, A Anishkin
The 'dashpot' mechanism of stretch-dependent gating in MscS
2005 NASA Cell Science Conference (NCSC), February 23 - 25, 2005, Moody Gardens Convention Center, Galveston, Texas (Talk)
2. Akitake B, Anishkin A, Sukharev S. 2005
The ‘dashpot’ mechanism of stretch-dependent gating in MscS
Biophysical Society Annual Meeting Abstracts Issue CD-ROM, 49th Annual Meeting, February 12-16, 2005, Long Beach, CA (Poster)
3. Anishkin A, Sukharev S. 2004
Water dynamics and dewetting transitions in the small mechanosensitive channel MscS and acetylcholine receptor.
Gordon Research Conference “Interfacial Water In Cell Biology”, Jun 6-11, 2004, Mount Holyoke, South Hadley, MA (Poster)
4. Anishkin A, Chiang CS, Sukharev S. 2004
Gating of the Large Mechanosensitive Channel In Situ. Estimation of the Spatial Scale of the Transition from Channel Population Responses
Gordon Research Conference “Ligand Recognition & Molecular Gating”, February 29 - March 5, 2004, Holiday Inn, Ventura, CA (Poster)
5. Anishkin A, Sukharev S. 2004
Water Dynamics and Dewetting Transitions in the Small Mechanosensitive Channel MscS.
Gordon Research Conference “Ligand Recognition & Molecular Gating”, February 29 - March 5, 2004, Holiday Inn, Ventura, CA (Poster)
6. Anishkin A, Chiang CS, Sukharev S. 2004
Gain-of-Function Mutations in the Pore Region Reveal Pre-Expanded Intermediate States and Sequential Action of Two Gates in MscL.
Gordon Research Conference “Ligand Recognition & Molecular Gating”, February 29 - March 5, 2004, Holiday Inn, Ventura, CA (Poster)
7. Anishkin A*, Sukharev S, Colombini M. 2004
Searching for the Molecular Arrangement of Transmembrane Ceramide Channels
Biophys. J. January 2004, Volume 86, Number 2, Part 2, 194a (Biophysical Society Annual Meeting Abstracts, 48th Annual Meeting, February 14-18, 2004, Baltimore, Maryland)
(Talk)
8. Anishkin A*, Sukharev S 2004
Water Dynamics and Dewetting Transitions in the Small Mechanosensitive Channel MscS

- Biophys. J. January 2004, Volume 86, Number 2, Part 2, 6a (Biophysical Society Annual Meeting Abstracts, 48th Annual Meeting, February 14-18, 2004, Baltimore, Maryland) (Talk)
9. Anishkin A*, Chiang CS, Sukharev S. 2003
Reconstruction of the Gating Pathway of MscL In Situ: Spatial Scale of the Transition, Sequential Action of two Gates, Intermediate and Alternative Open States
Gordon Research Conference "Cellular Osmoregulation: Sensors, Transducers And Regulators". August 10-15, 2003, Roger Williams University, Bristol, RI (Talk)
 10. Anishkin A, Sukharev S 2003
Water Dynamics and Dewetting Transitions in the Pore Region of MscS
Gordon Research Conference "Mechanotransduction & Gravity Signaling In Biological Systems", July 20-25, 2003, Connecticut College, New London, CT (Poster)
 11. Chiang CS, Anishkin A*, Sukharev S. 2003
Gain-of-function mutations in the pore region reveal pre-expanded intermediate states and sequential action of two gates in MscL
Biophys. J. February 2003, Volume 84, Number 2, Part 2, 21a (Biophysical Society Annual Meeting Abstracts, 47th Annual Meeting, March 1-5, 2003, San Antonio, Texas), (Talk)
 12. Anishkin A, Chiang CS, Sukharev S. 2003
Gating Parameters of the Large Mechanosensitive Channel In Situ
Biophys. J. February 2003, Volume 84, Number 2, Part 2, 232a (Biophysical Society Annual Meeting Abstracts, 47th Annual Meeting, March 1-5, 2003, San Antonio, Texas), (Poster)
 13. Anishkin A, Betanzos M, Chiang CS, Gendel V, Guy HR, Sukharev S 2002
Conformational transition in the large mechanosensitive channel MscL and the role of the C-terminal domain.
Gordon Research Conference "Ion Channels. July 14-19, 2002, Tilton School, Tilton, NH (Poster)
 14. Anishkin A, Gendel V, Betanzos M, Guy HR, Sukharev S 2002
On the Conformation of the C-Terminal Domain of the Large Mechanosensitive Channel MscL
Biophys. J. 2002 : 269a (Biophysical Society Annual Meeting Abstracts, 46th Annual , February 23-27, 2002, San Francisco, California) (Poster)
 15. Anishkin A, Gendel V, Betanzos M, Guy HR, Sukharev S 2001
On the Conformation of the C-Terminal Domain of MscL
Gordon Research Conference "Gravitational Effects on Living Systems: Mechanosensing". July 1-6, 2001, Connecticut College, New London, CT (Poster)
 16. Lemeshko VV, Anishkin AG*. 1998
Electro-Mathematical Modeling of Free-Radical Mechanism of Proton-Chemical Coupling. Thesis of II congress of Ukr. Biophys. Soc., 29 May, Kharkov, Ukraine. - 3 June, -1998, - p. 136. (Talk)
 17. Lemeshko VV, Anishkin AG. 1997
Computer Analysis of Proton-Chemical Hypothesis of Energy Coupling in Biomembranes. XVII Congreso Nacional de Fisica. Primer Congreso Nacional de Biofisica. Medellin, Colombia. 23-27 de junio, 1997,. - P.116-117. (Poster)
 18. Lemeshko VV, Anishkin AG*. 1996

Mathematical Modeling of Energy Coupling in Mitochondria in Frames of Proton-Chemical Hypothesis.

Thesis of II congress of Belor. Soc. Photobiol. Biophys., "Molecular and Cellular Fundamentals of Biosystems Functioning". Minsk, Belorussia. - 25-27 June, 1996. - P. 207. (Talk).