



VANDERBILT UNIVERSITY INSTITUTE OF IMAGING SCIENCE

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CURRICULUM VITAE

Vanderbilt University Institute of Imaging Science, Nashville, Tennessee
Assistant Professor of Radiology and Radiological Sciences 2009-

Education and Training

Huntington Medical Research Institutes, Pasadena, California
Howard Temin NIH/NCI K99 fellow
Research Investigator with Dr. Brian D. Ross 2008-2009

California Institute of Technology, Pasadena, California &
Huntington Medical Research Institutes, Pasadena, California
James G. Boswell Postdoctoral Fellow
with Daniel P. Weitekamp and Brian D. Ross 2007-2008

Huntington Medical Research Institutes, Pasadena, California
Senior Research Scientist with Brian D. Ross 2006

California Institute of Technology, Pasadena, California
Visiting Associate with Daniel P. Weitekamp 2006

National High Magnetic Field Laboratory, Tallahassee, Florida
Postdoctoral Associate with Timothy Cross 2003-2005

University of Louisville, Louisville, Kentucky
Ph.D. Physical Chemistry with Richard Wittebort 1998-2003

Perm State University, Perm, Russia
B.S. Metallo-organic Chemistry with Vasily Schepin 1994-1998

Honors, Certifications and Membership

The Government of Russia Scholarship 1997-1998
Honorary Citizen of Louisville, Kentucky 1998
Member of Biophysical Society and ISMRM
USA National Interest Waiver 2005
Clinical MR Spectroscopy Training Course XXI 2006
James G. Boswell Postdoctoral Fellowship 2006
NIH/NCI K99/R00 career award 2008

Research Interests

- Structure, function and dynamics at membrane interface by Magnetic Resonance
- Development of hyperpolarized MR techniques: parahydrogen and xenon based
- Hyperpolarized MR in bio-medical research by Magnetic Resonance

Patents

"Solid-State NMR Method For Screening Cell Membrane Protein Binding Drug Candidates"
Provisional patent filed on Sept. 29, 2006 (US Serial No. 60/827,552), patent filed on Oct. 1,
2007 (US Serial No. 11/865,302).

Extramural Grant Support

Cancer Research and Prevention Foundation (PI) "Early detection of breast cancer employing in vivo hyperpolarized glucose"	3/2007-3/2010	\$80,000
NIH/NCI K99/R00 career award (PI) "Novel hyperpolarized C-13 and N-15 biomarkers for metabolic MR imaging of cancer"	9/2008-6/2012	\$864,761

Teaching Experience

Teaching training in high school High school at Perm State University, Perm, Russia	1998
Graduate Teaching Assistant (General, Organic and Physical Chemistry: 203, 343, 461) University of Louisville, Louisville, Kentucky	1998-2002
Senior Instructor General Chemistry 203 University of Louisville, Louisville, Kentucky	2003
Supervisor for undergraduate students during summer research program National High Field Magnetic Laboratory, Tallahassee, Florida	2005
Supervisor for undergraduate students during summer research programs Caltech and HMRI, Pasadena, California	2006-2007

Publications (in chronological order including submitted and in press):

- Chekmenev, E. Y.;** Xu, R. Z.; Mashuta, M. S.; Wittebort, R. J. Glycyl $^{13}\text{C}^{\alpha}$ Chemical Shielding in Tripeptides: Measurement by Solid State NMR and Correlation with X-ray Structure and Theory *J. Am. Chem. Soc.* **2002**, *124*, 11894-11899.
- Zhang, Q.; **Chekmenev, E. Y.;** Wittebort, R. J. ^{17}O Quadrupole Coupling and Chemical Shielding Tensors in an H-bonded Carboxyl Group: α -Oxalic Acid *J. Am. Chem. Soc.* **2003**, *125*, 9140-9146.
- Chekmenev, E. Y.;** Zhang, Q.; Waddell, K. W.; Mashuta, M. S.; Wittebort, R. J. ^{15}N Chemical Shielding in Glycyl Tripeptides: Measurement by Solid-State NMR and Correlation with X-ray Structure *J. Am. Chem. Soc.* **2004**, *126*, 379-384.
- Pometun, M. S.; **Chekmenev, E. Y.;** Wittebort, R. J. Quantitative Observation of Backbone Disorder in Native Elastin *J. Biol. Chem.* **2004**, *279*, 7982-7987.
- Fan, T. W. M.; Lane, A. N.; **Chekmenev, E. Y.;** Wittebort, R. J.; Higashi, R. M. Synthesis and physico-chemical properties of peptides in soil humic substances *J. Peptide Research* **2004**, *63*, 253-264.
- Chekmenev, E. Y.;** Hu, J.; Gor'kov, P. L.; Brey, W. W.; Cross, T. A.; Ruuge, A.; Smirnov, A. I. ^{15}N and ^{31}P solid-state NMR study of transmembrane domain alignment of M2 protein of influenza A virus in hydrated cylindrical lipid bilayers confined to anodic aluminum oxide nanopores *J. Magn. Reson.* **2005**, *173*, 322-327.
- Waddell, K. W.; **Chekmenev, E. Y.;** Wittebort, R. J. Single Crystal Studies of Prolyl and Glycyl ^{15}N Shielding Tensors in Model Peptides *J. Am. Chem. Soc.* **2005**, *127*, 9030-9035.
- Fu, R.; Brey, W. W.; Shetty, K.; Gor'kov, P.; Saha, S.; Long, J. R.; Grant, S. C.; **Chekmenev, E. Y.;** Hu, J.; Gan, Z.; Sharma, M.; Zhang, F.; Logan, T. M.; Bruschweiler, R.; Edison, A.; Blue, A.; Dixon, I. R.; Markiewicz, W. D. and Cross, T. A. Ultra-Wide Bore 900 MHz High-Resolution NMR at the National High Magnetic Field Laboratory *J. Magn. Reson.* **2005**, *177*, 1-8.
- Hu, J.; **Chekmenev, E. Y.;** Gan, Z.; Gor'kov, P. L.; Saha, S.; Brey, W. W.; Cross, T. A. Ion Solvation by Channel Carbonyls Characterized by ^{17}O Solid State NMR at 21T *J. Am. Chem. Soc.* **2005**, 11922-11923.
- Li, C.; Mo, Y.; Hu, J.; **Chekmenev, E.;** Tian, C.; Gao, F. P.; Fu, R.; Gor'kov, P.; Brey, W.; Cross, T. A. Analysis of RF heating and sample stability in aligned static solid-state NMR spectroscopy *J. Magn. Reson.* **2006**, *179*, 361-367.
- Gor'kov, P. L.; **Chekmenev, E. Y.;** Fu, R.; Hu, J.; Cross, T. A.; Cotten, M.; Brey, W. W. A Large Volume Flat Coil Probe for Oriented Membrane Proteins *J. Magn. Reson.* **2006**, *181*, 9-20.
- Chekmenev, E. Y.;** Jones, S. M.; Nikolayeva, Y. N.; Vollmar, B. S.; Wagner, T. J.; Manion, McK. N.; Daugherty, K. C.; Kyriss, B. P.; Jacobsen, D. R.; Gor'kov, P. L.; Brey, W. W.; Auman, A. J.; Ellard-Ivey, M. A.; Cotten, M. Investigating Molecular Recognition and Biological Function at Interfaces Using Piscidins, Antimicrobial Peptides from Fish *BBA Biomembranes* **2006**, *1758(9)*, 1359-1372.
- Chekmenev, E. Y.;** Jones, S. M.; Nikolayeva, Y. N.; Vollmar, B. S.; Wagner, T. J.; Gor'kov, P. L.; Brey, W. W.; Manion, McK. N.; Daugherty, K. C.; Cotten, M. High-Field NMR Studies of Molecular Recognition and Structure-Function Relationships in Antimicrobial Piscidins at the Water-Lipid Bilayer Interface *J. Am. Chem. Soc.* **2006**, *128*, 5308-5309.

14. **Chekmenev, E. Y.**; Waddell, K. W.; Hu, J.; Gan, Z.; Wittebort, R. J. Cross, T. A. Ion binding Study by ^{17}O Solid-State NMR Spectroscopy in Model Peptide Gly-Gly-Gly *J. Am. Chem. Soc.* **2006**, *128*, 9849-9855.
15. Buffy, J. J.; Traaseth, N. J.; Mascioni, A.; Gor'kov, P. L.; **Chekmenev, E. Y.**; Brey, W. W.; Veglia, G. Two Topologies of Sarcolipin revealed by Two-Dimensional Solid State NMR *Biochemistry*, **2006**, *45*, 10939-10946.
16. Waddell, K. W.; **Chekmenev, E. Y.**; Wittebort, R. J. Peptide ^{17}O Chemical Shielding and Electric Field Gradient Tensors *J. Phys. Chem. B* **2006**, *110*(45), 22935-22941.
17. Hu, J.; **Chekmenev, E. Y.**; Cross, T. A. Anisotropic Chemical Shift Perturbation Induced by Ions in Conducting Channels in *Graham A. Webb (ed.), Modern Magnetic Resonance* **2006**.
18. **Chekmenev, E. Y.**; Gor'kov, P. L.; Cross, T. A.; Alaouie, A. M.; Smirnov, A. I. Flow-through Lipid Nanotube Arrays for Structure-function Studies of Membrane proteins by Solid-state NMR Spectroscopy *Biophys. J.* **2006**, *91*, 3076-3084.
19. Gor'kov, P. L.; **Chekmenev, E. Y.**; Cotten, M.; Buffy, J. J.; Traaseth, N. J.; Veglia, G.; Brey, W. W. Using low-E resonators to reduce RF heating in biological samples for static solid-state NMR up to 900 MHz *J. Magn. Reson.* **2007**, *185*, 77-93.
20. Bhattacharya, P.; **Chekmenev, E. Y.**; Perman, W. H.; Harris, K. C.; Norton, V. A.; Lin, A. P.; Tan, C. T.; Ross, B. D.; Weitekamp, D. P. Towards Hyperpolarized ^{13}C Succinate Imaging of Brain Cancer *J. Magn. Reson.* **2007**, *186*, 108-113.
21. Gor'kov, P. L.; Witter, R.; **Chekmenev, E. Y.**; Nozirov, F.; Fu, R.; Brey, W. W. Low-E ^{19}F - ^1H Probe for Solid-State NMR of Biological Solids *J. Magn. Reson.* **2007**, *190*, 17-24.
22. **Chekmenev, E. Y.**; Hoevener, J. B.; Norton, V. A.; Harris, K. C.; Batchelder, L. S.; Bhattacharya, P.; Ross, B. D.; Weitekamp, D. P. PASADENA Hyperpolarization of Succinic Acid for MRI and NMR *J. Am. Chem. Soc.* **2008**, *130*, 4212-4213.
23. **Chekmenev, E. Y.**; Chow, S.-K.; Tofan, D.; Weitekamp, D. P.; Ross, B. D.; Bhattacharya, P. Fluorine-19 NMR Chemical Shift Probes Molecular Binding to Lipid Membranes *J. Phys. Chem. B*, **2008**, *112*, 6285-6287.
24. **Chekmenev, E. Y.**; Ross, B. D.; Bhattacharya, P. Development of Hyperpolarized Metabolic Contrast Agents using PASADENA *Cambridge Isotope Laboratories*, **2008**, Application Note #21.
25. Hoevener, J. B.; **Chekmenev, E. Y.**; Harris, K. C.; Perman, W. H.; Robertson, L.; Ross, B. D. and Bhattacharya, P. PASADENA Hyperpolarization of ^{13}C Biomolecules: Equipment Design and Installation *Magn. Reson. Mater. Phys. Biol. Med.* **2009**, *22*, 111-121.
26. Hoevener, J. B.; **Chekmenev, E. Y.**; Harris, K. C.; Perman, W. H.; Tran, T. T.; Ross, B. D. and Bhattacharya, P. Quality Assurance of PASADENA Hyperpolarization for ^{13}C Biomolecules *Magn. Reson. Mater. Phys. Biol. Med.* **2009**, *22*, 123-134.
27. **Chekmenev, E. Y.**; Norton, V. A.; Weitekamp, D. P.; Bhattacharya, P. Hyperpolarized ^1H NMR Employing Low Gamma Nucleus for Spin Polarization Storage *J. Am. Chem. Soc.* **2009**, *131*, 3164-3165.
28. **Chekmenev, E. Y.**; Vollmar, B. S.; Cotten, M. Can antimicrobial peptide scavenge around a cell in less than a second? **submitted** to *BBA Biomembranes*.

Oral Presentations (*invited and at the scientific meetings in chronological order*):

1. **Chekmenev, E. Y.** *Ion binding by ^{17}O solid-state NMR spectroscopy* Southern California Users Magnets Meeting, Irvine, California, USA, Feb. 26, **2006**.
2. **Chekmenev, E. Y.** *Combating the diseases of the 21st century* Altadena Guild, March 2, Pasadena, California, **2007**.
3. **Chekmenev, E. Y.** *Towards hyperpolarized ^{13}C succinate for biomedical MR imaging and spectroscopy* 48th Experimental NMR Conference, CIL booth, Apr. 23-28, Daytona Beach, Florida, USA, **2007**.
4. **Chekmenev, E. Y.** *Towards hyperpolarized ^{13}C succinate for biomedical MR imaging and spectroscopy* 48th Experimental NMR Conference, Apr. 26, Daytona Beach, Florida, USA, **2007**.
5. **Chekmenev, E. Y.** *Towards Hyperpolarized ^{13}C Succinate Imaging of Brain Cancer* 15th ISMRM Conference, May, Berlin, Germany, **2007**.
6. **Chekmenev, E. Y.** *Towards ^{17}O Solid State NMR Spectroscopy of Ion-Selective Channels at Ultra-High Magnetic Fields* 2nd Annual Solid-State NMR Workshop, May 26, Winnipeg, Canada, **2007**.
7. **Chekmenev, E. Y.** *Hyperpolarized ^{13}C succinate for biomedical MR imaging and spectroscopy* 90th Canadian Chemistry Conference and Exhibition, May 28, Winnipeg, Canada, **2007**.
8. **Chekmenev, E. Y.** *Structure, Function and Dynamics in Biological Systems by Magnetic Resonance: from Molecules to Tissues* École Polytechnique Fédérale de Lausanne, Feb. 20, Lausanne, Switzerland, **2008**.
9. **Chekmenev, E. Y.** *Hyperpolarized Magnetic Resonance for Biomedicine* Brigham Hospital and Harvard Medical School, March 6, Boston, Massachusetts, **2008**.
10. **Chekmenev, E. Y.** *Hyperpolarized ^1H NMR Employing Low γ Nucleus as a Spin Order Storage* Euromar-2008 Meeting, July, Saint Petersburg, Russia, **2008**.