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1984 - 1992 Research Associate
High resolution NMR spectroscopy group
Institute of Inorganic Chemistry
Slovak Academy of Sciences, Bratislava, Slovakia

1980 - 1984 Graduate Research Assistant
Department of Physical Chemistry
College of Natural Sciences
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CURRENT FIELD OF WORK:

- Development of methods for in vivo NMR spectroscopy at ultra-high magnetic fields (4.0 – 9.4 T): spectroscopy pulse sequences, automatic shimming, data processing
- Development of methods for reliable metabolite quantification, construction of spectral databases for the analysis of in vivo spectra, simulation of spectra
- Examination of neurochemical processes in humans and experimental animals under normal and pathological conditions using NMR spectroscopy at very high magnetic fields (4 – 9.4T)
- Applications of the high field in vivo NMR spectroscopy for a non-invasive study of the neurochemistry of developing rat brain, effect of iron deficiency, hypoglycemia, hypoxia/ischemia
- Application of in vivo ^1H NMR spectroscopy for longitudinal monitoring of disease progression in transgenic mouse models of Huntington's disease
- Non-invasive investigation of neurochemical changes in activated human brain (visual stimulation) using ^1H NMR spectroscopy at 7T

CURRENT GRANT SUPPORT:

NIH grant P41RR008079 (PI: Ugurbil)
06/01/2008 - 05/31/2013
(Core IV Co-Inv: Tkac)
NMR Imaging and Localized Spectroscopy

Huntington Foundation A-1824 (PI: Dubinsky)
06/01/2008 - 05/31/2010
(Co-Inv: Tkac)
Longitudinal ^1H NMR Spectroscopy of Mouse HD

NIH grant NS35192 (PI: Seaquist)
04/01/2005 - 03/31/2010
(Co-Inv: Tkac)
Measurement of Glucose Homeostasis in Human Brain by NMR

NIH grant P01 HD039386 (PI: M. Georgieff)
05/01/2008 – 04/30/2010

(Co-Inv: I. Tkac)

Prime grant title: Behavior in Early Iron Deficiency (Prime PI: B. Lozoff)

NIH NCRR grant 1 S10 RR027290 (PI: Tkac)

02/20/2010 - 02/19/2011

High Performance Gradient and Shim System for a 4T Human MR Scanner

MEMBERSHIP:

International Society for Magnetic Resonance in Medicine (ISMRM) (1995 – Present)

- appointed by the president of the ISMRM as a member of the Annual Meeting Program Committee 2008 – 2011
- organizer of the Sunrise educational course “*Potentials and Challenges of High-Field MRS*”, (ISMRM 2010 – Stockholm)
- organizer of the weekday educational course “*Tools & Tips for Mouse Imaging & Spectroscopy*”, (ISMRM 2010 – Stockholm)
- organizer of the Sunrise educational course “*MRS – Metabolite Profiling and Metabolism*”, (ISMRM 2011 – Montreal)
- organizer of the weekday educational course “*Mouse imaging: How to do it Fast, Cheap and Better*”, (ISMRM 2011 – Montreal)

INVITED LECTURES:

1. *Shimming & MRS*, Sunrise educational course: ISMRM 2010 Annual Meeting, Educational Sunrise Course: “*Potentials and Challenges of High-Field MRS*”, Stockholm, May 1 – 7, 2010.
2. *Potentials of in vivo NMR spectroscopy at high magnetic fields*. Indiana University - Purdue University Indianapolis (Host: U. Dydak), Indianapolis, IL, Oct 14, 2009.
3. *Potentials of MRS at High Magnetic Fields*. Advanced Bioimaging Technologies Conference, Banff, AL, Canada, Sep 15 – 18, 2009.
4. *MRS at very high magnetic fields*. 47th Annual Meeting of the American Society of Neuroradiology, Vancouver, B.C., Canada, May 18 – 21, 2009.
5. *MRS in Mouse Models of Neurodegenerative Diseases*. ISMRM 2009 Annual Meeting, Educational Sunrise Course: “*Magnetic Resonance MRI and MRS of the Mouse Brain: Techniques and Applications*”, Honolulu, Apr 19 – 24, 2009.
6. *Quantification of GABA and glutamate from short echo-time in vivo ¹H NMR spectra*. ISMRM Workshop: “*MR Spectroscopy and Neurotransmitter Function in Neuropsychiatric Disorders: Focus on Glutamate and GABA*”, Quebec City, Canada, Nov 7 – 10, 2008.
7. *The ingredients of a successful MRS study at ultra-high field*, 16th Scientific Meeting of the International Society for Magnetic Resonance in Medicine, Morning Categorical Course: *Ultra-High Field MR in Humans*, Toronto, Canada, May 3 – 9, 2008.
8. *Potentials of in vivo NMR spectroscopy in neuroscience research*. Indiana University - Purdue University Indianapolis (Host: U. Dydak), Indianapolis, IL, Mar 28, 2008.

9. *Advances in high-field in vivo NMR spectroscopy*. Oklahoma Medical Research Foundation (Host: R. Towner, MRI Director), Oklahoma City, OK, Oct 4, 2007.
10. *Current potentials of the high-field ^1H NMR spectroscopy*. Institute for Clinical and Experimental Medicine (Host: M. Hajek), Prague, Czech Republic, Jun 1, 2007.
11. *High-resolution MRS in developing brain*. The MIND Institute, Symposium on Human Brain Development, Albuquerque, NM, May 8 – 9, 2007.
12. *In vivo ^1H NMR spectroscopy of experimental animals at high magnetic fields*. ISMRM Workshop on Advances in high-field MR, Asilomar, CA, Mar 25 – 28, 2007.
13. *In vivo ^1H NMR spectroscopy of brain at high magnetic fields*. Department of Neurology, Masaryk University, St. Anne's Hospital, Brno, Czech Republic, Oct 2, 2006.
14. *In vivo ^1H NMR spectroscopy at high magnetic fields*. Slovak Technical University, Bratislava, Slovakia, Sep 28, 2006.
15. *High-field ^1H NMR spectroscopy of brain and neurochemistry*. 23th Annual Meeting of the European Society for Magnetic Resonance in Medicine, Warsaw, Poland, Sep 21 – 23, 2006.
16. *In vivo ^1H NMR spectroscopy at ultra- high magnetic fields*. 34th Annual Meeting of the Japanese Society for Magnetic Resonance in Medicine, Tsukuba, Japan, Sep 14 - 16, 2006.
17. *In vivo ^1H NMR spectroscopy at very high magnetic fields*. 2005 Minnesota Workshop on High Field MR Imaging and Spectroscopy and MR Imaging of Brain Function, Minneapolis, MN, Oct 13 – 16, 2005.
18. *Distortions and Field Inhomogeneity, Shimming*. Hand on fMRI Training Course, 2005 Minnesota Workshop on High Field MR Imaging and Spectroscopy and MR Imaging of Brain Function, Minneapolis, MN, Oct 11 – 12, 2005.
19. *In vivo ^1H NMR spectroscopy at high magnetic fields*. Hoglund Brain Imaging Center, University of Kansas Medical School, Kansas City, KS, Dec 7, 2004.
20. *In vivo ^1H NMR spectroscopy at high magnetic fields*. Brain Imaging Research Center, University of Pittsburgh, Pittsburgh, PA, Nov 21, 2004.
21. *Our experience with NMR spectroscopy and fMRI at 7Tesla*. MIND Imaging Center, Albuquerque, NM, Nov 1, 2004.
22. *In vivo ^1H NMR spectroscopy at high magnetic fields – 2003 Minnesota Workshop on High Field MR Imaging and Spectroscopy*, Minneapolis, Oct 17 – 20, 2003.
23. *High field ^1H NMR spectroscopy in vivo – 10th NMR Workshop*, Kuopio, Finland, Aug 24-26, 2003.
24. *^{13}C NMR spectroscopy – 10th NMR Workshop*, Kuopio, Finland, Aug 24 – 26, 2003.
25. *In vivo ^1H NMR spectroscopy at ultra-high magnetic fields – University of Massachusetts Medical School, Center of Comparative Neuroimaging*, Worcester, MA, Apr 7, 2003.
26. *LCModel applications at high field - Spectroscopy beyond NAA - Morning Categorical Course*, 11th Scientific Meeting of the International Society for Magnetic Resonance in Medicine, Toronto, Canada, Jul 10-16, 2003.
27. *Ultra-high field proton MRS in animals – Weekend Educational Course – 10th Scientific Meeting of the International Society for Magnetic Resonance in Medicine*, Honolulu, Hawaii, May 18 – 24, 2002.

28. *Frequency domain processing – Spectroscopy beyond NAA* – Morning Categorical course, 10th Scientific Meeting of the International Society for Magnetic Resonance in Medicine, Honolulu, Hawaii, May 18 – 24, 2002.
29. *In vivo ¹H NMR spectroscopy at high magnetic fields*. Dept. of Chemistry and Biochemistry, University of Southern Mississippi, Hattiesburg, MS, Oct 26, 2001.
30. *In vivo ¹H NMR spectroscopy at high magnetic fields* – 2001 Minnesota Workshop on High field MR imaging and spectroscopy, Minneapolis, Oct. 5 – 6, 2001.
31. *Ultra-high field proton MRS in animals* – Weekend Educational Course – 9th Scientific Meeting of the International Society for Magnetic Resonance in Medicine, Glasgow, UK, April 21 – 27, 2001.
32. *Ultra-high field proton MRS in animals* – Weekend Educational Course – 8th Scientific Meeting of the International Society for Magnetic Resonance in Medicine, Denver, April 1 – 7, 2000.
33. *In vivo ¹H NMR spectroscopy of brain at high magnetic fields* – 9th International Symposium – New Frontiers of Neurochemistry and Biophysics in the Acute and Chronic Neurological Diseases, Martin, Slovakia, Aug. 16 – 19, 1999.

MOST SIGNIFICANT ACHIEVEMENTS:

1. **Tkac I**, Starcuk Z, Choi IY, Gruetter R. In vivo ¹H NMR spectroscopy of rat brain at 1 ms echo time. *Magn Reson Med* 1999; **41**: 649-56.
(Cited 198 times)
 - New method: high performance localization sequence with ultra-short echo-time developed for NMR spectroscopy of experimental animals at very high magnetic fields (9.4 Tesla)
 - New extremely efficient water suppression technique: VAPOR
2. **Tkac I**, Andersen P, Adriany G, Merkle H, Ugurbil K, Gruetter R. In vivo ¹H NMR spectroscopy of the human brain at 7 T. *Magn Reson Med* 2001; **46**: 451-6.
(Cited 115 times)
 - First *in vivo* NMR spectra of the human brain measured at very high magnetic field (7 Tesla)
3. Gruetter R, **Tkac I**. Field mapping without reference scan using asymmetric echo-planar techniques. *Magn Reson Med* 2000; **43**: 319-23.
(Cited 111 times)
 - New method for the fully automatic adjustment of magnetic field homogeneity
4. **Tkac I**, Rao R, Georgieff MK, Gruetter R. Developmental and regional changes in the neurochemical profile of the rat brain determined by in vivo ¹H NMR spectroscopy. *Magn Reson Med* 2003; **54**: 24-32.
(Cited 51 times)

- Precise quantification of 18 metabolites in different regions of the developing rat brain
5. Pfeuffer J, **Tkac I**, Provencher SW, Gruetter R. Toward an in vivo neurochemical profile: quantification of 18 metabolites in short-echo-time ^1H NMR spectra of the rat brain. *J Magn Reson* 1999; **141**: 104-20.
(Cited 193 times)
- LCModel analysis of ultra-short echo-time spectra of the rat brain measured at very high field (9.4 Tesla)
 - Reliable quantification of 18 brain metabolites
6. **Tkac I**, Henry PG, Andersen P, Keene CD, Low WC, Gruetter R. Highly resolved *in vivo* ^1H NMR spectroscopy of the mouse brain at 9.4 T. *Magn Reson Med* 2004; **52**: 478-484.
(Cited 54 times)
- Quantitative adjustment of the field homogeneity in a mouse brain using first- and second-order shim coils
 - Requirement for construction of shim coils for high field magnets (Major MR scanner manufactures, including Varian/Magnex, Resonance Research, Inc and Bruker, use our data and specifications for shim coil design)
 - High quality spectra from the mouse brain measured at high magnetic field (9.4 T)
 - Reliable quantification of 18 metabolites in four different brain regions

Tkac I, Komadel P, Muller D: Acid-Treated Montmorillonites - A Study by ^{29}Si and ^{27}Al MAS NMR. *Clay Minerals* 1994; 29: 11-19.
(Cited 66 times)

- Detailed structural analysis of clay minerals using solid state NMR spectroscopy

INSTALLATION OF THE DEVELOPED SOFTWARE FOR NMR SPECTROSCOPY AT HIGH MAGNETIC FIELDS

(including ultra-short TE STEAM sequence, data processing tools, interface and basis set for LCModel, FASTMAP shimming)

- 1) MR Imaging and Spectroscopy Center, National Institute of Environmental Studies, Tsukuba, Japan (Mar 2001, Sep 2006)
- 2) Center of Comparative Neuroimaging, University of Massachusetts Medical School Worcester, MA (Apr 2003)
- 3) Department of Biomedical NMR, A.I. Virtanen Institute for Molecular Sciences University of Kuopio, Kuopio, Finland (Aug 2003)
- 4) Brain Imaging Research Center, University of Pittsburgh, Pittsburgh, PA (Nov 2004)

- 5) Hogleund Brain Imaging Center, University of Kansas Medical School, Kansas City, KS (Dec 2004)
- 6) Indiana University-Purdue University Indianapolis, Indianapolis, IN – complete software package for spectroscopy at 9.4T (Mar 2008)
- 7) Indiana University-Purdue University Indianapolis, Indianapolis, IN – fine tuning and adjustment of spectroscopy techniques for 9.4T animal scanner (Oct 2009)

ACTIVE REVIEWER FOR SCIENTIFIC JOURNALS:

- Magnetic Resonance in Medicine
- NMR in Biomedicine
- Journal of Magnetic Resonance
- Journal of Magnetic Resonance Imaging
- Journal of Neurochemistry
- Diabetes Research and Clinical Practice
- MAGMA
- Brain Research
- BioMed Central - Neuroscience
- International Journal of Neuropsychopharmacology
- Radiology

LIST OF BOOK CHAPTERS:

- 1) Horska A, **Tkac I**, Magnetic Resonance Spectroscopy: Clinical Applications, In: Functional Neuroradiology: Principles and Clinical Applications, Editors: Scott Faro and Feroze B. Mohamed, Springer (in press).
- 2) Mangia S, **Tkac I**, Ugurbil, Investigation of the activated human primary visual cortex (V1) by functional MRS, In: Visual Cortex: New Research, Editors: Thomas A. Portocello and R. B. Velloti, Nova Science Publishers (2008), chapter 6.
- 3) Gruetter R, Henry PG, Lei H, Mangia S, Oz G, Terpstra M, **Tkac I**, In-Vivo NMR spectroscopy of the Brain at High Fields, In the book series: Biological Magnetic Resonance, Ultra High Field Magnetic Resonance Imaging (Volume 26), Editors: Robitaille PM and Berliner L, Springer (2007), p. 373 – 409.
- 4) Ugurbil K, Adriany G, Akgün C, Andersen P, Chen W, Garwood M, Gruetter R, Henry P-G, Marjanska M, Moeller S, Van de Moortele P-F, Prüssmann K, **Tkac I**, Vaughan JT, Wiesinger F, Yacoub E, Zhu X-H. High Magnetic Fields for Imaging Cerebral Morphology, Function and Biochemistry. In the book series: Biological Magnetic Resonance, Ultra High Field Magnetic Resonance Imaging (Volume 26), Editors: Robitaille PM and Berliner L, Springer (2007), p 285-342.

- 5) Gruetter R, Pfeuffer J, **Tkac I**, Damberg G, Seaquist ER. NMR studies of in vivo brain glucose concentrations and transport. In: Paulson O, Moos Knudsen G, Moos T, Editors. Brain Barrier Systems. Copenhagen: Munksgaard (1999), p 128-138.

PUBLICATIONS IN PEER-REVIEWED JOURNALS:

1. Traudt CM, **Tkac I**, Sutton LM, Mammel DM, Ennis KM, Rao R. Postnatal morphine exposure decreases neurogenesis in the dentate gyrus and alters the neurochemical profile of the hippocampus in developing rats. *Hippocampus* 2011; (under review).
2. Emir UE, Auerbach E, Van De Moortele PF, Marjanska M, Ugurbil K, Terpstra M, **Tkac I**, Oz G. Regional Neurochemical Profiles in the Human Brain measured by ¹H MRS at 7 Tesla using Local B₁ Shimming. *NMR Biomed* 2011; (under review).
3. Rao R, **Tkac I**, Schmidt AT, Georgieff MK. Fetal and Neonatal Iron Deficiency Causes Volume Loss and Alters the Neurochemical Profile of the Adult Rat Hippocampus. *Nutr Neurosci* 2011 (in press).
4. Mangia S, Liimatainen T, Garwood M, **Tkac I**, Henry PG, Deelchand D, Michaeli S. Frequency offset dependence of adiabatic rotating frame relaxation rate constants: relevance to MRS investigations of metabolite dynamics in vivo. *NMR Biomed* 2011; DOI: 10.1002/nbm.1626.
5. Oz G, **Tkac I**. Short-echo, single-shot, full-intensity 1H MRS for neurochemical profiling at 4T: Validation in the cerebellum and brainstem. *Magn Reson Med* 2010; DOI 10.1002/mrm.22708.
6. Carlson ES, Stephanie Fretham JB, Unger E, O'Connor M, Petryk A, Schallert T, Rao R, **Tkac I**, Georgieff MK. Hippocampus specific iron deficiency alters competition and cooperation between developing memory systems. *J Neurodevelop Disord* 2010; 2: 133–143.
7. Rao R, Ennis K, Long JD, Ugurbil K, Gruetter R, **Tkac I**. Neurochemical Changes in the Developing Rat Hippocampus During Prolonged Hypoglycemia. *J Neurochem* 2010; 114:728-38.
8. Terpstra M, Rao R, **Tkac I**. Region specific changes in ascorbate concentration during rat brain development quantified by in vivo 1H NMR spectroscopy. *NMR Biomed* 2010; 23: 1038-43.
9. Oz G, Hutter D, **Tkac I**, Clark B, Gross MD, Jiang H, Eberly LE, Bushara KO, Gomez CM. Neurochemical alterations in spinocerebellar ataxia type 1 and their correlations with clinical status. *Movement Disorders* 2010; 25: 1253-1261.
10. Terpstra M, Ugurbil K, **Tkac I**. Noninvasive quantification of human brain ascorbate concentration using ¹H NMR spectroscopy at 7T, *NMR Biomed* 2009; 23: 227-232.
11. **Tkac I**, Oz O, Adriany G, Ugurbil K, Gruetter R. In vivo ¹H NMR spectroscopy of the human brain at high magnetic fields: Metabolite quantification at 4T vs. 7T. *Magn Reson Med* 2009; 62: 868-879.
12. Mangia S, Giove F, **Tkac I**, Logothetis NK, Henry PG, Olman CA, Maraviglia B, Di Salle F, Ugurbil K. Metabolic and hemodynamic events after changes in neuronal activity: current

- hypotheses, theoretical predictions and in vivo NMR experimental findings. *J Cereb Blood Flow Metab* 2009; 29: 441-63.
13. Gybina AA, **Tkac I**, Prohaska JR. Copper deficiency alters the neurochemical profile of developing rat brain. *Nutr Neurosci* 2009; 12: 114-122.
 14. Carlson ES, **Tkac I**, Magid R, O'Connor MB, Andrews NC, Schallert T, Gunshin H, Georgieff MK, Petryk A. Iron Is Essential for Neuron Development and Memory Function in Mouse Hippocampus. *J Nutr* 2009; 139: 672-679.
 15. Mangia S, **Tkac I**. Letter to the editor. *J Mol Neurosci* 2008; 35: 245-246.
 16. Ward KL, **Tkac I**, Jing Y, Felt B, Beard J, Connor J, Schallert T, Georgieff MK, Rao R, Gestational and Lactational Iron Deficiency Alters the Developing Striatal Metabolome and Associated Behaviors in Young Rats. *J Nutr* 2007; 137: 1043-1049.
 17. **Tkac I**, Dubinsky JM, Keene CD, Gruetter R, Low WC, Neurochemical changes in Huntington R6/2 mouse striatum detected by in vivo ^1H NMR spectroscopy. *J Neurochem* 2007; 100: 1397-1406.
 18. Rao R, **Tkac I**, Townsend EL, Ennis K, Gruetter R, Georgieff M, Perinatal iron deficiency predisposes the developing rat hippocampus to injury in mild to moderate hypoxia ischemia. *J Cereb Blood Flow Metab* 2007; 27: 729-740.
 19. Mangia S, **Tkac I**, Logothetis N, Gruetter R, Van de Moortele PF, Ugurbil K, Dynamics of lactate concentration and BOLD effect in the human visual cortex during repeated identical stimuli. *J Neurosci Res* 2007; 85: 3340-3346.
 20. Mangia S, **Tkac I**, Van de Moortele PF, Maraviglia B, Ugurbil K, Sustained neuronal activation raises oxidative metabolism to a new steady state level: evidence from ^1H NMR spectroscopy in the human visual cortex. *J Cereb Blood Flow Metab* 2007; 27: 1055-1063.
 21. Henry PG, Russeth KP, **Tkac I**, Drewes LR, Andrews MT, Gruetter R, Brain energy metabolism and neurotransmission at near-freezing temperatures: in vivo ^1H MRS study of a hibernating mammal. *J Neurochem* 2007; 101: 1505-1515.
 22. Liimatainen T, Hakumäki J, **Tkac I**, Gröhn O, Ultra short echo time spectroscopic imaging in rat: Implication for monitoring lipids in glioma gene therapy. *NMR Biomed* 2006; 19: 554-559.
 23. Terpstra M, **Tkac I**, Rao R, Gruetter R, Quantification of vitamin C in the rat brain in vivo using short echo-time ^1H MRS. *Magn Reson Med* 2006; 55: 979-983.
 24. Terpstra M, Marjanska M, Henry PG, **Tkac I**, Gruetter R. Detection of an antioxidant profile in the human brain in vivo via double editing with MEGA-PRESS. *Magn Reson Med* 2006; 56: 1192-1199.
 25. Oz G, Terpstra M, **Tkac I**, Aia P, Lowary J, Tuite P, Gruetter R, Proton MRS of the Unilateral Substantia Nigra in the Human Brain at 4 Tesla: Detection of High GABA Concentrations. *Magn Reson Med* 2006; 55: 296-301.
 26. Mangia S, **Tkac I**, Gruetter R, Van De Moortele PF, Giovec G, Maraviglia B, Ugurbil K, Sensitivity of single-voxel ^1H -MRS in investigating the metabolism of the activated human visual cortex at 7 T. *Magn Reson Imag* 2006; 24: 343-348.
 27. **Tkac I**, Gruetter R, In vivo ^1H NMR spectroscopy and neurochemistry. Quantification matters. *Magn Reson Med* 2005; 54: 1048-1049.

28. **Tkac I**, Gruetter R, Methodology of ^1H NMR spectroscopy of the human brain at very high magnetic fields. *App Magn Reson* 2005; 29: 139-157.
29. Oz G, Henry PG, **Tkac I**, Gruetter R, A localization method for the measurement of fast relaxing ^{13}C NMR signals in humans at high magnetic fields. *App Magn Reson* 2005; 29: 159-169.
30. Seaquist E, **Tkac I**, Damberg G, Thomas W, Gruetter R, Brain glucose concentrations in poorly controlled diabetes mellitus as measured by high field magnetic resonance spectroscopy. *Metabolism* 2005; 54: 1008-1013.
31. Raman L, **Tkac I**, Ennis K, Georgieff MK, Gruetter R, Rao R, In vivo Effect of Chronic Hypoxia on the Neurochemical Profile of the Developing Rat Hippocampus. *Develop Brain Res* 2005; 156: 202-209.
32. Oz G, **Tkac I**, Charnas LR, Choi I-Y, Bjoraker KJ, Shapiro EG, Gruetter R, Assessment of adrenoleukodystrophy lesions by high field MRS in non-sedated pediatric patients. *Neurology* 2005; 64: 434-441.
33. Criego AB, **Tkac I**, Kumar A, Thomas W, Gruetter R, Seaquist ER, Brain glucose concentrations in healthy humans subjected to recurrent hypoglycemia. *J Neurosci Res* 2005; 82: 525-530.
34. Criego AB, **Tkac I**, Kumar A, Thomas W, Gruetter R, Seaquist ER. Brain glucose concentrations in patients with type 1 diabetes and hypoglycemia unawareness. *J Neurosci Res* 2005; 79: 42-47.
35. **Tkac I**, Henry PG, Andersen P, Keene CD, Low WC, Gruetter R. Highly resolved *in vivo* ^1H NMR spectroscopy of the mouse brain at 9.4 tesla. *Magn Reson Med* 2004; 52: 478-484.
36. Ugurbil K, Adriany G, Andersen P, Chen W, Garwood M, Gruetter R, Henry PG, Kim SG, Lieu H, **Tkac I**, Vaughan T, Van De Moortele PF, Yacoub E, Zhu XH. Ultrahigh field magnetic resonance imaging and spectroscopy. *Magn Reson Imaging* 2003; 21:1263-1281.
37. **Tkac I**, Rao R, Georgieff MK, Gruetter R. Developmental and regional changes in the neurochemical profile of the rat brain determined by *in vivo* ^1H NMR spectroscopy. *Magn Reson Med* 2003; 50: 24-32.
38. Rao R, **Tkac I**, Townsend EL, Gruetter R, Georgieff MK. Perinatal iron deficiency alters the neurochemical profile of the developing rat hippocampus. *J Nutr* 2003; 133: 3215-3221.
39. Henry PG, **Tkac I**, Gruetter R. ^1H -localized broadband ^{13}C NMR spectroscopy of the rat brain *in vivo* at 9.4 T. *Magn Reson Med* 2003; 50: 684-692.
40. **Tkac I**, Keene CD, Pfeuffer J, Low WC, Gruetter R. Metabolic changes in quinolinic acid-lesioned rat striatum detected non-invasively by *in vivo* ^1H NMR spectroscopy. *J Neurosci Res* 2001; 66: 891-898.
41. **Tkac I**, Andersen P, Adriany G, Merkle H, Ugurbil K, Gruetter R. *In vivo* ^1H NMR spectroscopy of the human brain at 7 T. *Magn Reson Med* 2001; 46: 451-456.
42. Seaquist ER, Damberg GS, **Tkac I**, Gruetter R. The effect of insulin on *in vivo* cerebral glucose concentrations and rates of glucose transport/metabolism in humans. *Diabetes* 2001; 50: 2203-2209.

43. Pfeuffer J, **Tkac I**, Gruetter R. Extracellular-intracellular distribution of glucose and lactate in the rat brain assessed noninvasively by diffusion-weighted ^1H nuclear magnetic resonance spectroscopy in vivo. *J Cereb Blood Flow Metab* 2000; 20: 736-746.
44. Gruetter R, **Tkac I**. Field mapping without reference scan using asymmetric echo-planar techniques. *Magn Reson Med* 2000; 43: 319-323.
45. Choi IY, **Tkac I**, Gruetter R. Single-shot, three-dimensional "non-echo" localization method for in vivo NMR spectroscopy. *Magn Reson Med* 2000; 44: 387-394.
46. Braunova Z, Kasparova S, Mlynarik V, Mierisova S, Liptaj T, **Tkac I**, Gvozdjakova A. Metabolic changes in rat brain after prolonged ethanol consumption measured by ^1H and ^{31}P MRS experiments. *Cell Mol Neurobiol* 2000; 20: 703-715.
47. **Tkac I**, Starcuk Z, Choi IY, Gruetter R. In vivo ^1H NMR spectroscopy of rat brain at 1 ms echo time. *Magn Reson Med* 1999; 41: 649-656.
48. Stvolinsky SL, Kukley ML, Dobrota D, Matejovicova M, **Tkac I**, Boldyrev AA. Carnosine: an endogenous neuroprotector in the ischemic brain. *Cell Mol Neurobiol* 1999; 19: 45-56.
49. Pfeuffer J, **Tkac I**, Provencher SW, Gruetter R. Toward an in vivo neurochemical profile: quantification of 18 metabolites in short-echo-time ^1H NMR spectra of the rat brain. *J Magn Reson* 1999; 141: 104-120.
50. Pfeuffer J, **Tkac I**, Choi IY, Merkle H, Ugurbil K, Garwood M, Gruetter R. Localized in vivo ^1H NMR detection of neurotransmitter labeling in rat brain during infusion of $[1-^{13}\text{C}]$ D-glucose. *Magn Reson Med* 1999; 41: 1077-1083.
51. Choi IY, **Tkac I**, Ugurbil K, Gruetter R. Noninvasive measurements of $[1-^{13}\text{C}]$ glycogen concentrations and metabolism in rat brain in vivo. *J Neurochem* 1999; 73: 1300-1308.
52. Mierisova S, van den Boogaart A, **Tkac I**, Van Hecke P, Vanhamme L, Liptaj T. New approach for quantitation of short echo time in vivo ^1H MR spectra of brain using AMARES. *NMR Biomed* 1998; 11: 32-39.
53. Latta P, Jellus V, Budinsky L, Mlynarik V, **Tkac I**, Luypaert R. Motion artifacts reduction in DWI using navigator echoes: a robust and simple correction scheme. *Magma* 1998; 7: 21-27.
54. Keevil SF, Barbiroli B, Brooks JC, Cady EB, Canese R, Carlier P, Collins DJ, Gilligan P, Gobbi G, Hennig J, Kugel H, Leach MO, Metzler D, Mlynarik V, Moser E, Newbold MC, Payne GS, Ring P, Roberts JN, Rowland IJ, Thiel T, **Tkac I**, Topp S, Wittsack HJ, Podo F, et al. Absolute metabolite quantification by in vivo NMR spectroscopy: II. A multicentre trial of protocols for in vivo localised proton studies of human brain. *Magn Reson Imaging* 1998; 16: 1093-1106.
55. De Beer R, Barbiroli B, Gobbi G, Knijn A, Kugel H, Langenberger KW, **Tkac I**, Topp S. Absolute metabolite quantification by in vivo NMR spectroscopy: III. Multicentre ^1H MRS of the human brain addressed by one and the same data-analysis protocol. *Magn Reson Imaging* 1998; 16: 1107-1111.
56. Hanusovska E, Dovinova I, **Tkac I**, Novotny L. Application of NMR spectroscopy in biochemical studies of tumor cells sensitive and resistant to anticancer drugs. *Neoplasma* 1998; 45: 187-197.
57. Sakharov SG, Buslaev YA, **Tkac I**. Multinuclear NMR Study of the Structure and Intramolecular Dynamics of (eta(2)-Acetone phenylhydrazonato)tetrafluorooxotungsten (VI). *Inorg Chem* 1996; 35: 5514-5519.

58. **Tkac I**, Komadel P, Muller D: Acid-Treated Montmorillonites - A Study by ^{29}Si and ^{27}Al MAS NMR. *Clay Minerals* 1994; 29: 11-19.
59. Lycka A, **Tkac I**, Holecek J, Pejchal V. Magnitudes and Relative Sign of $J(^{119}\text{Sn}, ^{13}\text{C})$ and $J(^{119}\text{Sn}, ^1\text{H})$ Coupling Constants in Some Vinyltin(IV) Compounds Obtained by 2D NMR Spectroscopy. *Magn Reson Chem* 1994; 32, 189-191.
60. Zurkova L, Spacek S, **Tkac I**. Synthesis and properties of tripropylammonium decavanadates. *Chem Pap-Chem Zvesti* 1994; 48: 295-299.
61. Liska J, Borsig E, **Tkac I**. A route to preparation of bromomethylated poly(2,6-dimethyl-1,4-phenylene oxide). *Angew Makromol Chem* 1993; 211: 121-129.
62. **Tkac I**, Holecek J, Lycka A. Stereochemistry of diorganotin(IV) bis(8-quinolinolate) and bis(8-quinolinethiolate) complexes in solution studied by NOE-difference spectroscopy. *J Organomet Chem* 1991; 418: 311-320.
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