Licensing Contact: Jeffrey A. James, PhD; 301–435–5474; *jeffreyja@mail.nih.gov*.

Collaborative Research Opportunity: The National Institute of Mental Health, Laboratory of Neuropsychology, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize decoding algorithm for neuronal responses. Please contact Suzanne Winfield at *winfiels@mail.nih.gov* or 301–402–4324 for more information.

Dated: April 7, 2009.

Richard U. Rodriguez,

Director, Division of Technology Development and Transfer, Office of Technology Transfer, National Institutes of Health.

[FR Doc. E9–8473 Filed 4–13–09; 8:45 am]

BILLING CODE 4140–01–P

DEPARTMENT OF HEALTH AND HUMAN SERVICES

National Institutes of Health

Government-Owned Inventions; Availability for Licensing: Methods for Improvements and Enhancements of Diffusion Tensor MRI

AGENCY: National Institutes of Health, HHS.

ACTION: Notice.

SUMMARY: The inventions listed below are owned by an agency of the U.S. Government and are available for licensing in the U.S. in accordance with 35 U.S.C. 207 to achieve expeditious commercialization of results of Federally-funded research and development. Foreign patent applications are filed on selected inventions to extend market coverage for companies and may also be available for licensing.

FOR FURTHER INFORMATION CONTACT: Licensing information and copies of the U.S. patent applications listed below may be obtained by contacting either Uri Reichman, PhD, MBA (Phone: 301–435–4616; Fax: 301–402–0220; E-mail: *UR7a@nih.gov*) or John Stansberry, PhD (Phone: 301–435–5236; Fax: 301–402–0220; E-mail: *stansbej@mail.nih.gov*) at the Office of Technology Transfer, National Institutes of Health, 6011 Executive Boulevard, Suite 325, Rockville, Maryland 20852–3804. A signed Confidential Disclosure Agreement will be required to receive copies of the patent applications.

SUPPLEMENTARY INFORMATION: The technology offered for licensing is in the field of Diffusion Magnetic Resonance Imaging (MRI). Specifically, three new methods have been described and claimed that enhance the scope and applicability of Diffusion Tensor MRI (DTI or DT–MRI).

The invention of DTI represented a breakthrough in MRI. It provides a method and system for measuring the effective diffusion tensor of spin-labeled molecules, and for generating images of key tensor-derived parameters that indicate features of tissue microstructure, organization and even physiological state. DTI data has improved the diagnosis of a large number of diseases, disorders, and conditions, and is also being used therapeutically, for instance, to aid neurosurgical planning.

One of the pioneers in Diffusion MRI, Dr. Peter Basser, a Principal Investigator in NIH's Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), is the primary inventor of DTI. Dr. Basser's first contribution in this field is described in US Patent #5,539,310 (issued July 23, 1996), entitled ''Method and System for Measuring the Diffusion Tensor and for Diffusion Tensor Imaging.'' His new inventions (described below) extend the specificity and clinical value of diffusion MRI data, particularly in elucidating fine microstructural details and features that are not detectable using DTI.

Diffusion Tensor and q-Space MRI Specimen Characterization

Description of Technology

Diffusion Tensor MRI (DTI or DT–MRI) provides information primarily about how water diffuses in the extracellular compartment of tissues, where water mobility is hindered (*i.e.*, where water diffuses freely but encounters barriers from which it is reflected). However, DTI does not provide a complete characterization of diffusion in the intracellular compartment of some cells, particularly myelinated axons, where water mobility is restricted by impermeable membranes (*i.e.*, where water is trapped but otherwise free to diffuse within the cell).

The subject invention provides a new modeling framework that self-consistently describes 3–D anisotropic diffusion within a hindered extracellular compartment and within a restricted intra-axonal compartment. It results in an improved characterization and measurement tissue and cell microstructure in neuronal tissue, which promises to advance diagnosis of neurological conditions (*e.g.*, Stroke, MS, Alzheimer's disease), possibly cognitive and behavioral disorders (*e.g.*, schizophrenia), as well as our ability to follow normal development and aging processes.

More specifically, this new in vivo diffusion MRI method, especially suited for the characterization of brain white matter, marries q-space and DTI concepts: Diffusion within axons is modeled as hindered diffusion parallel to the axis of the axon, and restricted diffusion perpendicular to the axis. Diffusion exterior to axons is modeled as hindered diffusion with differing diffusivities parallel and perpendicular to the nerves' axis. To practice this method, diffusion weighted (DW) MRI data are acquired from specimens at different q-values (with different diffusion gradient magnitudes and directions). Parameters associated with tissue microstructure, such as the intra and extra-axonal principal diffusivities and their corresponding principal directions, and the volume fractions of intra and extra-axonal space are then estimated from these data. Improved angular resolution of fiber tract orientation can be obtained for tractography studies and more microstructural information can be gleaned for both diagnostic and therapeutic purposes than from conventional DTI. This technology has been named CHARMED (Composite Hindered and Restricted Model of Diffusion).

Inventors

Peter J. Basser (NICHD) *et al.*

Publications

1. Y Assaf, RZ Freidlin, GK Rohde, PJ Basser. New modeling and experimental framework to characterize hindered and restricted water diffusion in brain white matter. Magn Reson Med. 2004 Nov;52(5):965–978.

2. Y Assaf and PJ Basser. Composite hindered and restricted model of diffusion (CHARMED) MR imaging of the human brain. Neuroimage 2005 Aug 1;27(1):48–58.

3. L Avram, E Özarslan, Y Assaf, A Bar-Shir, Y Cohen, PJ Basser. Three-dimensional water diffusion in impermeable cylindrical tubes: theory versus experiments. NMR Biomed. 2008 Oct;21(8):888–898.

4. A Bar-Shir, L Avram, Y Assaf, PJ Basser, Y Cohen. Experimental Parameters and Diffraction Patterns at High q Diffusion MR: Experiments and Theoretical Simulations. Proc Intl Soc Mag Reson Med. 2007;15:1530.

Patent Status

U.S. Patent Application No. 10/888,917 filed 08 Jul 2004, claiming

priority to 08 Jul 2003 (HHS Reference No. E–079–2003/0–US–02).

Non-Invasive in vivo MRI Axon Diameter Measurement Methods

Description of Technology

This invention describes an improvement and continuation of the CHARMED MRI framework described above, extending this technology to measure the axon diameter distribution (ADD) of nerve bundles (fascicles) in the central and peripheral nervous systems.

The invention essentially consists of a non-obvious combination of CHARMED MRI and an improvement of an NMR method, originally developed for particle sizing in porous media applications, which was extended and enhanced to provide a direct measurement of the ADD within nerve fascicles in the brain, spine or other parts of the peripheral nervous system on a voxel-by-voxel basis. Additionally this approach can be extended to measure the fiber orientation distribution of axons within each voxel of an imaging volume and particularly the myelin content within each voxel.

The significance of this invention is that it represents a way to provide a non-invasive, painless, in vivo measurement of microanatomical (histological) features of nerves (and possibly muscles) that are critically important in medicine and the neurosciences and previously were only available using invasive histological means requiring biopsy. The ADD is altered in abnormal development (possibly even in autism), in degenerative processes (*e.g.*, aging, alcoholism, Alzheimer's disease) and diseases such as ALS (Lou Gehrig's disease). The ADD is a critically important parameter of a nerve bundle from a neuroscience perspective because axon diameter determines the conduction velocity of action potentials, and thus the arrival time and latency of nerve impulses traveling along them. The orientation or directional distribution of axons is important in Tractography applications to help determine how different cortical regions of the brain are connected to each other via white matter pathways. Myelin is dynamically regulated in vivo and affects the electrical insulating property of axons, and thus the conduction velocity of nerves. Myelin content is a critically important parameter in MS and a large number of dysmyelinating and demyelinating diseases as well as in normal and abnormal development.

Inventors

Peter J. Basser (NICHD) *et al.*

Publications

1. Y Assaf, T Blumenfeld-Katzir, Y Yovel, PJ Basser. AxCaliber: a method for measuring axon diameter distribution from diffusion MRI. Magn Reson Med. 2008 Jun;59(6):1347–1354.

2. D Barazany, PJ Basser, Y Assaf. In vivo measurement of axon diameter distribution in the corpus callosum of rat brain. Brain 2009; p 1–11.

3. D Barazany, PJ Basser, Y Assaf. In-vivo measurement of the axon diameter distribution in the rat's corpus callosum. In Proc Intl Soc Mag Reson Med. 2008;16:567.

4. D Barazany, P Basser, Y Assaf. AxCaliber—in-vivo measurement of axon diameter distribution with MRI. In 16th Annual Meeting of The Israel Society for Neuroscience, Eilat, Israel; November 25–27, 2007; p. 8–9.

5. PJ Basser, T Blumenfeld, G Levin, Y Yovel, Y Assaf. AxCaliber: an MRI method to measure the diameter distribution and density of axons in neuronal tissue. In Magn Reson Imaging 2007;25:550.

6. Y Assaf and PJ Basser. Non parametric approach for axon diameter distribution estimation from diffusion measurements. In Proc Intl Soc Mag Reson Med. 2007;15:1536.

7. PJ Basser, T Blumenfeld, G Levin, Y Yovel, Y Assaf. AxCaliber: an MRI method to measure the diameter distribution and density of axons in neuronal tissue. In 8th International Bologna Conference on Magnetic Resonance in Porous Media 2006; p. 37.

8. Y Assaf, T Blumenfeld, G Levin, Y Yovel, PJ Basser. AxCaliber—a method to measure the axon diameter distribution and density in neuronal tissues. In Proc Intl Soc Mag Reson Med. 2006;14:637.

Patent Status

U.S. Patent Application No. 12/114,713 filed 02 May 2008 (HHS Reference No. E–079–2003/1–US–01), which is a CIP of the above U.S. Patent Application No. 10/888,917.

Magnetic Resonance Specimen Evaluation Using Multiple Pulse Field Gradient Sequences

Description of Technology

A further enhancement to the diffusion MRI technologies described above is offered in this further extension. The invention proposes and claims an MRI-method that is based on the measurement and acquisition of multiple pulsed field gradient (m-PFG) rather than the previously used single-pulsed field gradient (s-PFG) MRI sequences. In particular, double PFG (d-PFG) sequences offer higher sensitivity and greater robustness, as it is more sensitive to the effect of ''restriction'', *i.e.*, to water trapped within the axon's intracellular space, and thus to the diameter of the axons. It renders the MR sequence more sensitive to ''pore size'' and ''pore shape'' and thus makes the measurement of the ADD more sensitive and accurate. Moreover, measurements using the multiple-PFG sequence can be performed readily at ''low b'' or ''low q'', making it biologically relevant and clinically feasible.

Inventors

Peter J. Basser and Evren Özarslan (NICHD).

Publications

1. E Özarslan and PJ Basser. Microscopic anisotropy revealed by NMR double pulsed field gradient experiments with arbitrary timing parameters. J Chem Phys 2008 Apr 21;128(15):154511.

2. ME Komlosh, MJ Lizak, F Horkay, RZ Freidlin, PJ Basser. Observation of microscopic diffusion anisotropy in the spinal cord using double-pulsed gradient spin echo MRI. Magn Reson in Med. 2008 Apr;59(4):803–809.

3. E Özarslan and PJ Basser. MR diffusion -''diffraction'' phenomenon in multi-pulse-field-gradient experiments. J Magn Reson. 2007 Oct;188(2):285–294.

4. ME Komlosh, F Horkay, RZ Freidlin, U Nevo, Y Assaf, PJ Basser. Detection of microscopic anisotropy in gray matter and in a novel tissue phantom using double Pulsed Gradient Spin Echo MR. J Magn Reson. 2007 Nov;189(1):38–45.

5. ME Komlosh, RZ Freidlin, F Horkay, Y Assaf, PJ Basser. Detection of microscopic anisotropy in gray matter using d-PGSE. In Proc Intl Soc Mag Reson Med. 2005;13:843.

6. ME Komlosh, MJ Lizak, F Horkay, RZ Friedlin, PJ Basser. (2006) Detection of local anisotropy using double-PGSE filtered imaging. In 47th Experimental Nuclear Magnetic Resonance Conference, 2006.

7. E Özarslan and PJ Basser. Diffusion-Diffraction Phenomenon in multi-PFG experiments. In Science Networking Development Scheme Meeting. Ein–Boqeq, Israel, 2007.

8. M E Komlosh, MJ Lizak, F Horkay, RZ Freidlin, PJ Basser. Observation of microscopic diffusion anisotropy in the spinal cord using double-pulsed gradient spin echo MRI. In Proc Intl Soc Mag Reson Med. 2008;16:763.

9. E Özarslan and PJ Basser. Microscopic anisotropy revealed by double-PFG NMR. In 9th International Bologna Conference on Magnetic Resonance in Porous Media 2008; p. 26.

10. E Özarslan, CG Koay, PJ Basser. Double-PFG diffusion-diffraction in ellipsoidal pores. In 9th International Bologna Conference on Magnetic Resonance in Porous Media 2008; p. 115.

Patent Status

U.S. Provisional Application No. 61/087,968 filed 11 Aug 2008 (HHS Reference No. E–276–2008/0–US–01).

Advantages

The three inventions described above and collectively offered for licensing offer a non-invasive, painless means for measurement quantities such as the axon diameter distribution (ADD) and significant improvements in sensitivity and robustness to existing MRI methods, in particular for imaging of the Central Nervous System, and for *in vivo* measurement of microanatomical (histological) features of nerves (and possibly muscles) that are critically important in medicine and in particular in neuroscience. Furthermore, ADD is altered in abnormal development (possibly even in autism), in degenerative process (*e.g.*, aging, alcoholism, Alzheimer's disease) and diseases such as ALS (Lou Gehrig's disease) and thus the improved sensitivities offered by the subject inventions is of utmost significance for public health.

Development Status

These inventions are fully developed.

Market

The market for MRI in human diagnostics is huge and rapidly growing. The race to improve the sensitivities of MRI measurement and to enhance the capabilities of measuring and examining fine structures in general, and in neuroscience in particular is of significant magnitude. The three inventions described above may collectively offer significant commercial opportunity to MRI companies.

The market for medical imaging equipment industry is approximately $9.0 billion dollars now and has been growing by approximately 7.6% annually. MRI instrumentation constitutes a significant portion of this market.

Related Technology

U.S. Patent No. 5,539,310 issued 23 Jul 1996—''Method and System for Measuring the Diffusion Tensor and for Diffusion Tensor Imaging'' (HHS Reference No. E–203–1993/0).

Licensing Status

Available for licensing.

Licensing Contacts

Uri Reichman, PhD, MBA; 301–435–4616; *UR7a@nih.gov;* John Stansberry, PhD; 301–435–5236; *stansbej@mail.nih.gov*.

Collaborative Research Opportunity

The Eunice Kennedy Shriver National Institute of Child Health and Human Development, Section on Tissue Biophysics and Biomimetics, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize novel MRI methods to probe tissue structure and organization, particularly for neuroimaging applications. Please contact Alan Hubbs, PhD at 301–594–4263 or *hubbsa@mail.nih.gov* for more information.

Dated: April 7, 2009.

Richard U. Rodriguez,

Director, Division of Technology Development and Transfer, Office of Technology Transfer, National Institutes of Health.

[FR Doc. E9–8475 Filed 4–13–09; 8:45 am]

BILLING CODE 4140–01–P

DEPARTMENT OF HEALTH AND HUMAN SERVICES

National Institutes of Health

National Institute of Neurological Disorders and Stroke; Notice of Closed Meeting

Pursuant to section 10(d) of the Federal Advisory Committee Act, as amended (5 U.S.C. App.), notice is hereby given of the following meeting.

The meeting will be closed to the public in accordance with the provisions set forth in sections 552b(c)(4) and 552b(c)(6), Title 5 U.S.C., as amended. The grant applications and the discussions could disclose confidential trade secrets or commercial property such as patentable material, and personal information concerning individuals associated with the grant applications, the disclosure of which would constitute a clearly unwarranted invasion of personal privacy.

Name of Committee: National Institute of Neurological Disorders and Stroke Special Emphasis Panel; Clinical Trials in Motor Neuron Disease.

Date: April 20, 2009.

Time: 2 p.m. to 4 p.m.

Agenda: To review and evaluate grant applications.

Place: National Institutes of Health, 6101 Executive Boulevard, Rockville, MD 20852, (Telephone Conference Call)

Contact Person: Shanta Rajaram, PhD, Scientific Review Administrator, Scientific Review Branch, Division Of Extramural Research, NINDS/NIH/DHHS/Neuroscience Center, 6001 Executive Blvd., Suite 3208, MSC9529, Bethesda, MD 20852, (301) 435–6033, *rajarams@mail.nih.gov*.

This notice is being published less than 15 days prior to the meeting due to the timing limitations imposed by the review and funding cycle.

(Catalogue of Federal Domestic Assistance Program Nos. 93.853, Clinical Research Related to Neurological Disorders; 93.854, Biological Basis Research in the Neurosciences, National Institutes of Health, HHS)

Dated: April 7, 2009.

Anna Snouffer,

Deputy Director, Office of Federal Advisory Committee Policy.

[FR Doc. E9–8471 Filed 4–13–09; 8:45 am]

BILLING CODE 4140–01–P

DEPARTMENT OF HEALTH AND HUMAN SERVICES

National Institutes of Health

Eunice Kennedy Shriver National Institute of Child Health & Human Development; Notice of Meeting

Pursuant to section 10(a) of the Federal Advisory Committee Act, as amended (5 U.S.C. App.), notice is hereby given of the following meeting.

The meeting will be open to the public, with attendance limited to space available. Individuals who plan to attend and need special assistance, such as sign language interpretation or other reasonable accommodations, should notify the Contact Person listed below in advance of the meeting.

Name of Committee: National Institute of Child Health and Human Development Special Emphasis Panel; ''Comparative Evaluation of Assisted Reproductive Technologies and Birth Outcomes''.

Date: May 6, 2009.

Time: 2 p.m. to 3 p.m.

Agenda: To provide concept review of proposed concept review.

Place: National Institutes of Health, 6100 Executive Boulevard, Room 5B01, Rockville, MD 20852 (Telephone Conference Call).

Contact Person: Sathasiva B. Kandasamy, PhD, Scientific Review Administrator, Division of Scientific Review, National Institute of Child Health and Human Development, 6100 Executive Boulevard, Room 5b01, Bethesda, MD 20892–9304, (301) 435–6680, *skandasa@mail.nih.gov*.

(Catalogue of Federal Domestic Assistance Program Nos. 93.864, Population Research; 93.865, Research for Mothers and Children; 93.929, Center for Medical Rehabilitation Research; 93.209, Contraception and Infertility Loan Repayment Program, National Institutes of Health, HHS)