

Media Release

Thunder Bay scientist publishes leading paper on breakthrough technique for imaging brain function

The technique uses hyperpolarized xenon MRI to non-invasively image brain activity

Thunder Bay, Ontario (Dec. 8, 2011)— Dr. Mitchell Albert, newly recruited Scientist at the Thunder Bay Regional Research Institute (TBRRI) and Research Chair and Professor of Chemistry at Lakehead University, recently published a paper reporting an innovative new technology for imaging cerebral activity in the brain: hyperpolarized (HP) xenon MRI.

Dr. Albert's study, published with lead author Mary Mazzanti and colleagues, was conducted while Dr. Albert was a faculty member at Harvard Medical School. The study was published in the peer-reviewed science journal *PLoS ONE*.

The team applied Hyperpolarized (HP) xenon MRI, for the first time, to image activity in the cerebral cortex. This new technique has an additional powerful utility in comparison to conventional MRI – HP xenon MRI allows scientists to image blood flow throughout the body, including the brain. And because blood flow correlates with neural activity, HP xenon MRI can serve as a tool for direct functional MR imaging of the brain.

One of the most important implications of this study is that it might someday be used to diagnose and guide treatment for various diseases of the brain, including Alzheimer's disease, Parkinson's disease, and schizophrenia.

“This important discovery demonstrates for the first time that HP xenon MRI can be used to image brain activity with one-shot (using one image),” says Dr. Albert. “It has a much higher signal intensity than the clinical standard we use now to image the brain known as functional MRI, which depends on many images being taken. It can image not only thought processes of the normal brain, but also diagnose psychiatric diseases including Alzheimer's disease, Parkinson's disease, schizophrenia, and many others.”

Dr. Albert adds, “It's potentially a breakthrough because it's never been done before. To my knowledge, we're the only lab in the world working on this. Functional MRI was the first big step, and it's today's standard for brain imaging, but HP xenon MRI might be the next giant leap forward.”

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Dr. Michael Wood is Vice President of Research at Thunder Bay Regional Health Sciences Centre (TBRHSC) and TBRRI. He says this study is another example of how the Research Institute is growing the capability to conduct leading-edge medical imaging research right here in Northwestern Ontario. Dr. Wood adds, “The HP xenon MRI technique could be another breakthrough in MRI.”

To view the entire journal article visit:

<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0021607>

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Dr. Mitchell Albert is available for media interviews upon request.

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Scientific Background:

The study applied HP gas MRI, for the first time, to image activity in the cerebral cortex. Conventional MRI detects protons in water molecules. HP gas MRI, on the other hand, which Dr. Albert co-invented in the 1990s, detects helium-3 or xenon-129 atoms. HP helium MRI and HP xenon MRI can both be used to image ventilation function in the lungs, something conventional MRI cannot do. But HP xenon MRI has an additional powerful utility — it allows scientists to image where blood flows throughout the body, including the brain. And because blood flow correlates with neural activity, HP xenon MRI can serve as tool for direct functional MR imaging of the brain.

Although conventional MRI has been used for some time to study brain activity (known as functional MRI [fMRI]), this was the first time HP xenon MRI has ever been used for functional brain imaging of cerebral activity.