

**Volume 2, Number 28 – December 11, 2008**

**fMRI**  
**BRAIN**

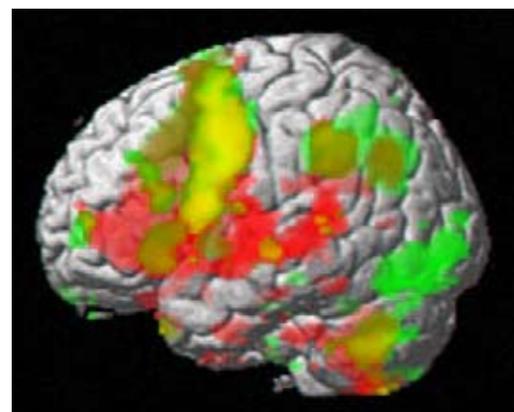
**MRI Helps Translate Thought into Sound for Man with “Locked-In Syndrome”**

When Jean-Dominique Bauby wrote his stunning and transcendent memoir, *The Diving Bell and the Butterfly*, he communicated it letter by letter by blinking his left eye.<sup>1</sup> Bauby suffered from “locked-in syndrome,” a rare neurological disorder that paralyzes all voluntary muscles except those controlling eye movements.<sup>2</sup>

For such patients, no means of communication exist except nonvocal ones. However, a recent article describes an advance which could some day allow these individuals to communicate through sound instead of gestures.

*Naturenews* reports a study that used an implanted brain electrode to permit a man with locked-in syndrome to create vowel sounds, after using functional brain MRI to assess his speech.<sup>3</sup>

Scientists from Boston University placed the electrode in the speech area of the man’s brain and a computer decoded the brain signals. The electrode activated a speech synthesizer that accurately replicated three vowel sounds. As reported at the Society for Neuroscience’s annual meeting in November 2008, the team will subsequently work on computer decoding of consonants to allow the creation of complete words. *Naturenews* notes that functional MRI or electrodes placed on the skull could also be used to decode brain speech. **Conclusion: A man with locked-in syndrome was able to create audible vowel sounds using an implanted brain electrode and speech synthesizer, after having his thoughts analyzed by functional MRI.**



*fMRI image of the human brain.*

**IMAGING**  
**ANGIOGENESIS**

**Exploiting Novel Molecules That Create and Comprise Cancer Vessels**

The new blood vessels that grow and sustain cancer originate when stimulated to occur by molecules released from cancer cells. These molecular activators of angiogenesis include a host of proteins and small molecules.<sup>4</sup> The study of these factors may bring to fruition new and robust imaging for tumor detection and surveillance, as well as innovative therapeutic modalities for tumor cure. The two molecules thought to be the most important sustainers of tumor growth are **vascular endothelial factor (VEGF)** and **basic fibroblast growth factor (bFGF)**. Other activators of angiogenesis include prostaglandins E1 and E2, nicotinamide, and interleukin 8, among others. The resultant new tumor vessels display their own novel molecules, providing more investigative avenues to target.<sup>5</sup> **The following article highlights one recent attempt to exploit these molecular features of cancer.**

**NANO-**  
**PARTICLES/**  
**CANCER**

**Imaged Nanoparticles Target Cancer Vessels and Decrease Tumor Size**

Integrin  $\alpha v \beta 3$  comprises one factor found on some tumor vascularity. Researchers at University of California, San Diego created a nanoparticle targeted at integrin that was linked with the

chemotherapeutic agent doxorubicin. The authors made it fluorescent and injected it into a live mouse pancreatic cancer model. As reported in *Proceedings of the National Academy of Science*,<sup>6</sup> the authors noted modest decreased primary tumor growth, but significant reduction in the draining lymph-node metastases. Featured in *Naturenews*,<sup>7</sup> the study also reported that the treatment reduced metastases in a mouse kidney cancer model. **Conclusion: Fluorescent nanoparticles, linked with a chemotherapeutic agent that were targeted at molecules found exclusively on new vessels, have been reported to decrease metastases in mice pancreatic and kidney cancers.**

## SOURCES

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## NEXT ISSUE: MORE CLINICAL TRIAL IMAGING NEWS AND STUDIES



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