

**MRI**  
FIBROMYALGIA

### Fibromyalgia Patients Demonstrate Different Brain Metabolite Levels on Proton MR Spectroscopy

A study from the University of Michigan investigated brain metabolite differences between people with fibromyalgia (FM) and healthy controls (HC). The authors sought to test the hypothesis that the broad pain sensitivity experienced by fibromyalgia patients related to a central nervous system processing problem, which would therefore display metabolic alteration in those brain areas involved in processing pain. Published in the *American Journal of Neuroradiology* in May 2008, the study examined 21 patients with FM and 27 controls.

Conventional MR was supplemented with 2D-chemical shift imaging (CSI) MR-spectroscopy. The spectroscopy centered at the basal ganglia and supraventricular white matter. Within these regions, the study interrogated the spectrographic features of smaller areas implicated in pain processing. The authors calculated the N-acetylaspartate (NAA)/creatine (Cr), choline (Cho)/Cr, and NAA/Cho ratios for each voxel. They also performed clinical and experimental pain assessments on all the subjects. The Cho/Cr variability in the right dorsolateral prefrontal cortex proved significantly different in patients with fibromyalgia as compared to controls. NAA/Cho ratios in the left insula and left basal ganglia showed significant correlation with evoked pain threshold.<sup>1</sup>

**Conclusion: Patients with fibromyalgia demonstrate baseline brain metabolite variability differences compared to healthy controls. Those with fibromyalgia also show significant correlation between metabolite ratios and pain parameters.**

**MRI**  
PANCREATIC  
CANCER

### Targeted Nanoparticles Image Small Pancreatic Cancers and Cancer Precursor Lesions in Mice

Pancreatic cancer typically eludes detection until the tumor has reached an incurable state. In an effort to discover small cancers and precursor lesions that may be curable, researchers at the Massachusetts General Hospital and Dana Farber Cancer Institute developed a novel imaging approach. The technique exploits the cancer cells' mutations, which cause different cell-surface proteins to be present than in normal cells. After detecting several peptides bound to the outside of pancreatic cancer cells but absent on normal cells, an imaging probe was created to make use of this difference.

As reported online in April 2008 by the *Public Library of Science*, the researchers next found a virus phage clone that bound to these mouse tumor cell peptides. To accomplish imaging the lesions, the investigators then linked the phages to nanoparticles that had both magnetic and fluorescent properties. Using mouse models, the nanoparticles allowed detection of small pancreatic ductal carcinomas and precursor lesions.<sup>2</sup>



*This CT scan of the upper abdomen shows a tumor (pancreas carcinoma) in the head of the pancreas (arrow).*

of small pancreatic ductal carcinomas and precursor lesions.- **Conclusion: The imaging of small and precursor pancreatic adenocarcinomas in mice was accomplished by using nanoparticles linked to viral phages which, in turn, bind to pancreatic carcinoma cell surface peptides. If the approach can be successfully translated for use in humans, some tumors heretofore typically diagnosed when already incurable could be discovered earlier.**

## CCTA

### Dual-Source Coronary Artery CT Angiography Promising for Atrial Fibrillation Patients

Currently, coronary artery computed tomographic angiography (CCTA) technique relies on imaging the vasculature in the setting of a slow heart rate with regular rhythm. When tachycardia or irregular beats occur during imaging, image blurring may preclude a diagnostic evaluation of the coronary arteries. Patients with atrial fibrillation are therefore contraindicated, because faster scanner times than those available with 64-slice, multi-detector scanners would be required.

Authors from Cedars-Sinai Medical Center and University of California—Los Angeles examined dual-source CT (DSCT) for coronary evaluation in 24 patients with atrial fibrillation (AF) and compared it to 119 control patients in sinus rhythm. The patients underwent B-blockade to achieve heart rates of 65 beats per minute or less and were also given nitroglycerin. Bolus tracking was employed with retrospective ECG-gating. The control group underwent tube current modulation; this was not used in the AF patients to maximize the visualization of all phases of the cardiac cycle. Patients in both groups had similar coronary calcium scores and prevalence of coronary artery disease. In the atrial fibrillation group, 2 (8%) of studies proved nondiagnostic, compared to 12 (10%) of the nondiagnostic control group exams.<sup>3</sup> **Conclusion: Atrial fibrillation patients may be able to undergo diagnostic CCTA in dual-source CT scanners.**



*This volume-rendered image of the heart is from a dual-source CT scanner.*

#### SOURCES:

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3. Wolak A, Gutstein A, Cheng VY, *et al.* "Dual-Source Coronary Computed Tomography Angiography in Patients with Atrial Fibrillation: Initial Experience." *Journal of Cardiovascular Computed Tomography* 2008; 2:172-180.

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