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The WCC Note™

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A Weekly Guide To Harmonizing Clinical Trial Imaging

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MRI BRAIN

Imaging Reveals Astrocytes Can Respond to Visual Stimuli

Neurons are known as the principal functioning cells in the brain, receiving, storing, and transmitting information.[1] Higher-order functions such as sight, therefore, rely on neurons. The brain's star-shaped astrocyte cells are thought to perform functions for neurons, metabolically buffering, detoxifying, supplying nutrients, and electrically insulating them. Astrocytes also contribute to brain barriers and play a principal role in brain repair and brain scar formation.[2] Until now, the ability to see had not been a role ascribed (in part) to astrocytes. Yet researchers at the Massachusetts Institute of Technology recently documented that astrocytes do indeed respond to visual stimuli. The authors used two-photon imaging of calcium signals *in vivo*, employing a ferret visual cortex model. As reported in *Science*, astrocytes displayed distinct spatial receptive fields, as well as orientation and spatial associations.[3] The finding suggests the role of both neurons and astrocytes in vision. This holds implications for non-invasive imaging techniques that study brain activity, such as functional MRI. **Conclusion: Imaging shows that astrocytes join neurons as cells known to respond to visual stimuli.**

MRI CONTRAST

Alternative MRI Contrast Agent Can Deliver Therapeutic Drugs

Gadolinium has dominated the MRI contrast market since it was approved for human use 20 years ago. More than 85 million doses had been administered by 2007, about 5 million annually.[4] A recent study in the *Journal of the American Chemical Society* reports the creation of a novel MRI contrast agent that is not gadolinium-based, but rather manganese-labeled, toroidal (doughnut-shaped) nanoparticles. This new molecular agent can target fibrin, a constituent of a clot. The authors, from Washington University School of Medicine, Philips HealthCare, and St. Thomas Hospital (London), state that the agent can also incorporate chemotherapeutic compounds, raising the possibility of its exhibiting both diagnostic and therapeutic utilities.[5] **Conclusion: A novel MRI contrast agent can not only target the fibrin in thrombus, but also deliver therapeutic compounds.**

CT CARDIAC

Pericardial Fat Is Related to Calcified Coronary Artery Plaque

The U.S. Centers for Disease Control (CDC) report that an estimated 66 percent of U.S. adults and 17 percent of children and adolescents are overweight.[6] Inflammatory cytokines exist at higher levels in pericardial fat than in subcutaneous fat. To assess whether pericardial fat is associated with calcified coronary artery plaque, researchers for the Multiethnic Study of Atherosclerosis examined the volume of pericardial fat on cardiac CT in 159 patients in Forsythe County, NC, and evaluated for calcified coronary artery plaque.[7] As reported in the research journal *Obesity*, pericardial fat proved significantly associated with calcified coronary artery plaque, even when adjusting for other cardiovascular risk factors, and was independent of gender and ethnicity. **Conclusion: Pericardial fat is associated with calcified coronary artery plaque, independent of gender and ethnicity.**

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NEXT ISSUE: MORE CLINICAL TRIAL IMAGING NEWS AND STUDIES

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