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References

1. FDA Guidance—Humanitarian Device Exemptions (HDE) Regulation: Questions and Answers; Final Guidance for Industry Document issued on July 12, 2001. Available at: <http://www.fda.gov/cdrh/ode/guidance/1668.html>
2. Kaplan AV, Harvey ED, Kuntz RE, et al. **Humanitarian Use Devices/Humanitarian Device Exemptions in cardiovascular medicine.** *Circulation* 2005; 112:2883–86
3. Kelly ME, Furlan AJ, Fiorella D. **Recanalization of an acute middle cerebral artery occlusion using a self-expanding, reconstrainable, intracranial microstent as a temporary endovascular bypass.** *Stroke* 2008;39:1770–73
4. Turk AS, Levy EI, Albuquerque FC, et al. **Influence of patient age and stenosis location on Wingspan in-stent restenosis.** *AJNR Am J Neuroradiol* 2008;29:23–7

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EDITORIAL

Functional MR Imaging and the Future of Neuroradiology

This month's issue of the *American Journal of Neuroradiology* features a very interesting article entitled, "Effects of Donepezil on Cortical Activation in Mild Cognitive Impairment: A Pilot Double-Blind Placebo-Controlled Trial Using Functional MR Imaging."¹ Briefly, the authors found increased activation in the donepezil group relative to the placebo group in the ventrolateral prefrontal cortex and decreased activation in the placebo group relative to the donepezil group in the dorsolateral prefrontal cortex. In addition, the left inferior frontal gyrus demonstrated enhanced activation associated with donepezil but not the placebo. These results suggest the presence of specific cortical targets for donepezil's actions, which may be evaluated in future research.

Apart from the direct objectives of the study reported, the article points to the importance of advanced imaging and related research for the future of neuroradiology. Functional MR imaging (fMRI) provides the potential to achieve a greater understanding of relatively uncharted central nervous system

diseases, especially dementia and, specifically, Alzheimer disease.² Mild cognitive impairment, the focus of the above article, may be a forerunner of Alzheimer disease. Understanding mild cognitive impairment and the effects of donepezil via fMRI raises the potential for predicting clinical response to therapy and may help guide future clinical trials of new treatment.

Developmental disorders such as autism and psychiatric diseases such as schizophrenia are also very active areas of fMRI research.^{3,4} These diseases have not previously been associated with specific imaging findings that are evaluated in routine clinical practice. With new means of studying these diseases via advanced neuroimaging, we may find underlying, specific defects to be targeted in treatment.

We have advanced beyond anatomic imaging and tissue characterization into the realm of neural tissue physiology. We are able to investigate not only "how does the brain appear?" but also "how does the brain function?" or, more to the point, "how does the brain malfunction under the duress of disease?" fMRI will help us to answer these questions, and perhaps even newer modalities using molecular or genetics imaging strategies will take us further.⁵ What lies ahead for us are real challenges: We must incorporate functional imaging into our research agendas and our clinical practices. These tools must become part of the core competencies of neuroradiologists.

The American Society of Functional Neuroradiology (ASFNR) is a great advocate for the development of advanced neuroimaging. Established at an organizational meeting during the Annual Meeting of the American Society of Neuroradiology in 2004, this group will undoubtedly play a key role in keeping neuroradiology at the forefront of new technology. The third Annual Meeting of ASFNR will be held later this month, February 25–27, 2009, in San Antonio, Tex.

References

1. Petrella JR, Prince SE, Krishnan S, et al. **Effects of Donepezil on cortical activation in mild cognitive impairment: a pilot double-blind placebo-controlled trial using functional MR imaging.** *AJNR Am J Neuroradiol* 2009;30:411–16
2. Krishnan S, Talley BD, Slavin MJ, et al. **Current status of functional MR imaging, perfusion-weighted imaging, and diffusion-tensor imaging in Alzheimer disease diagnosis and research.** *Neuroimaging Clin N Am* 2005;15:853–68
3. Kleinhans NM, Richards T, Sterling L, et al. **Abnormal functional connectivity in autism spectrum disorders during face processing.** *Brain* 2008;131:1000–12
4. Hugdahl K, Rund BR, Lund A, et al. **Brain activation measured with fMRI during a mental arithmetic task in schizophrenia and major depression.** *Am J Psychiatry* 2004;161:286–93
5. Petrella JR, Mattay VS, Doraiswamy PM. **Imaging genetics of brain longevity and mental wellness: the next frontier?** *Radiology* 2008;246:20–32

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