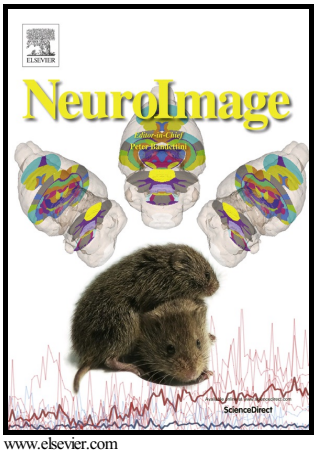
Exploration of Human Visual Cortex Using High Spatial Resolution Functional Magnetic Resonance Imaging

Kang cheng



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Exploration of Human Visual Cortex Using High Spatial Resolution Functional Magnetic Resonance Imaging

Kang Cheng
Support Unit for Functional Magnetic Resonance Imaging, and
Laboratory for Cognitive Brain Mapping
RIKEN Brain Science Institute
2-1 Hirosawa, Wako, Saitama 351-0198, Japan
Tel: +81 48 467 9730; E-mail: kcheng@postman.riken.jp

Abstract

In this review focusing primarily on the work conducted in my group at RIKEN Brain Science Institute, I will first briefly summarize what we have achieved in mapping columnar organizations in human primary visual cortex using blood oxygenation-level dependent (BOLD) functional magnetic resonance imaging (fMRI), including ocular dominance columns, temporal frequency dependent domains, and orientation selective columns. I will then touch upon a couple of recent successful attempts in the field in mapping functional architectures in human extrastriate cortices, including human middle temporal complex and secondary and tertiary visual areas (V2 and V3), and discuss what we have learned regarding the spatial specificity of BOLD fMRI. Finally, I will offer some of my personal thoughts on how functional architectures may be organized in relation to underlying microvasculature and how such functional architectures may be experimentally explored.

Keywords: High spatial resolution fMRI, human, striate cortex (V1), extrastraite cortex, pointe spread function, microvasculature