What is functional MR imaging (fMRI)?

MRI is a technique for viewing the brain's structure and functions. Two main forms exist. The first is structural MRI, which provides detailed pictures of the brain's shape and size. The second is functional MRI, a technique that allows researchers to visualize and map the parts of the brain used to perform everyday tasks, such as reading and calculation. We use both structural and functional MRI for our studies.

The MRI machine is, in essence, a big magnet. As you lie in its magnetic field, invisible radio waves are released around you. This will result in harmless radio waves bouncing off the different substances that make up your brain. These radio waves are then detected by a computer, which transforms the data into images of the brain's structure and activity.

Current Studies

We are actively recruiting participants for studies on:

- dyslexia and children
- dyslexia and adults
- autism and children
- working memory

Interested in becoming a participant? Please contact us! Visit our website at **http://web.mit.edu/gabrieli-lab/**

Representative Publications

1. Vaidya, C.J., Bunge, S.A., Dudukovic, N.M., Zalecki, C.A., Elliott, G.R., and Gabrieli, J.D.E. (2005). Altered neural substrates of cognitive control in childhood ADHD: Evidence from functional magnetic resonance imaging. American Journal of Psychiatry, 162, 1605-1613.

2. Anderson, M.C., Ochsner, K.N., Kuhl, B., Cooper, J., Robertson, E., Gabrieli, S.W., Glover, G.H., and Gabrieli, J.D.E. (2004). Neural systems underlying the suppression of unwanted memories. Science, 203, 232-235.

3. Temple , E., Deutsch, G.K., Poldrack, R., Miller, S.L., Tallal, P., Merzenich, M.M., and Gabrieli, J.D.E. (2003). Neural deficits in children with dyslexia ameliorated by behavioral remediation: Evidence from fMRI. Proceedings of the National Academy of Sciences of the United States of America, 100, 2860-2865.

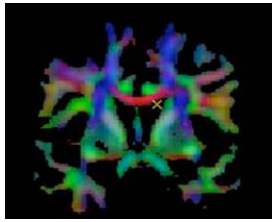
Massachusetts Institute of Technology

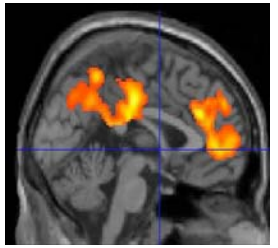
Laboratory of John Gabrieli
43 Vassar Street, 46-4033
Cambridge, MA 02139, USA
Phone: (617) 324-2896
Fax: (617) 258-8654
Website: http://web.mit.edu/gabrieli-lab/

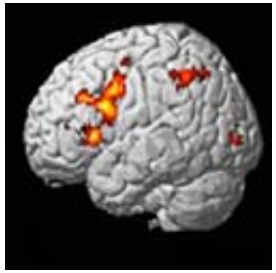
Massachusetts Institute of Technology

Laboratory of John Gabrieli

Cognitive & Affective Neuroscience







http://web.mit.edu/gabrieli-lab/

About our research

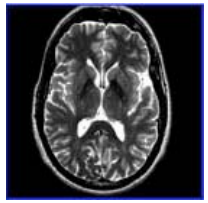
In the Cognitive & Affective Neuroscience Laboratory of John Gabrieli at MIT, we study the organization of memory, thought, and emotion in the human brain.

We aim to discover:

- how the healthy brain supports human capacities (such as hippocampal support for declarative memory or amygdala support for emotional memory)
- how experience alters functional brain organization (brain plasticity)
- how disadvantageous variations in brain structure and function underlie diseases and disorders
- how potential behavioral or pharmacologic treatments alter brain function when they are therapeutically effective.

We want to understand principles of brain organization that are consistent across individuals, and those that vary across people due to age, personality, and other dimensions of individuality. Therefore, we examine brain-behavior relations across the life span, from children through the elderly.

We have studied developmental disorders (dyslexia, ADHD, autism), age-related disorders (Alzheimer's disease, Parkinson's disease), and psychiatric disorders (depression, social phobia, schizophrenia).



Methods

Our primary methods of research are brain imaging (functional and structural), and the experimental behavioral study of patients with brain injuries. The majority of our studies involve functional magnetic resonance imaging (fMRI), but we also employ other brain measures as needed to address scientific questions, including diffusion tensor imaging (DTI), MRI structural volumes, and voxel-based morphometry (VBM).

Research Facilities

Much of our research occurs in the Martinos Imaging Center at the McGovern Institute for Brain Research at MIT in Cambridge, MA, which is affiliated with the Athinoula A. Martinos Center for Biomedical Imaging in Charlestown, MA.

The Martinos Centers are a collaboration among the Harvard-MIT Division of Health Sciences and Technology (HST), the McGovern Institute for Brain Research, Massachusetts General Hospital, and Harvard Medical School. Our affiliations with these outstanding research institutions promote the opportunity for cutting-edge basic cognitive neuroscience research and translation from basic science to clinical application.

About the Principal Investigator

John Gabrieli, Ph.D., is one of the country's foremost memory researchers. He is the Grover Hermann Professor of Health Sciences and Technology and Cognitive Neuroscience at the Massachusetts Institute of Technology (MIT). He has a dual appointment in the Harvard-MIT Division of Health Sciences and Technology (HST) and the Department of Brain and Cognitive Sciences, and is also an Associate of the McGovern Institute for Brain Research. He is Director of the Martinos Imaging Center at the McGovern Institute for Brain Research, and Co-Director of the MIT Clinical Research Center. He received a B.A. in English from Yale (1978), a Ph.D. in Behavioral Neuroscience from the Department of Brain and Cognitive Sciences at MIT (1987), and was a postdoctoral fellow in the Psychology Department at Harvard. He has authored more than 200 publications in human cognitive neuroscience, in which he studies the brain basis of memory, language, and thought.

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