

FUNCTIONAL MAGNETIC RESONANCE IMAGING (FMRI) IMAGE

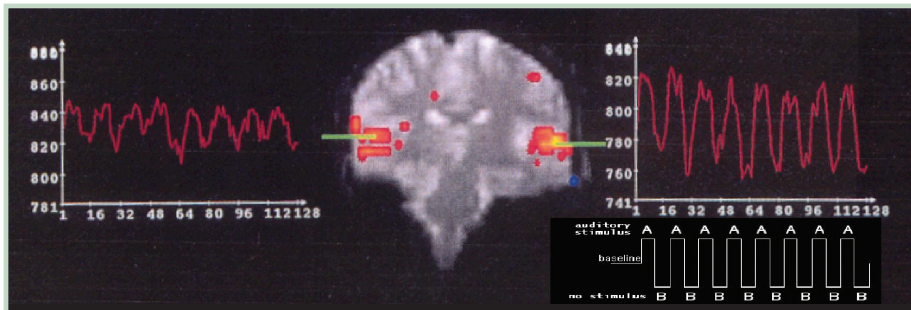


Figure 5

(Maddock RJ, UC Davis Imaging Center. Permission from Maddock RJ)
Kile SJ. *Mental Fitness*. 2004;3(3):24-31.

the cortex.⁴⁰ This is an indication of abnormal migration during development and likely results in abnormal cortical connections. These findings may explain white matter abnormalities found with DTI.

Post-mortem studies show neurochemical abnormalities⁴¹ remarkably consistent with MRS findings of low NAA in patients with schizophrenia as mentioned above. Post-mortem demonstration of the dopaminergic dysregulation related to the positive symptoms of schizophrenia is difficult due to the fact these positive symptoms tend to subside with age and post-mortem studies are more frequently performed in older persons.⁹

A REVIEW OF CLINICAL USES OF NEUROIMAGING, CURRENT AND NEAR-FUTURE

Clinical Assessment

Although there is no current clinical neuroimaging gold standard to identify schizophrenia in patients, neuroimaging does have important present clinical value. Neuroimaging is utilized to rule out other CNS pathology such as intracranial or metastatic neoplasms, various infections, trauma, and multiple other medical conditions. Current neuropsychiatric recommendations for clinical imaging in psychiatric patients are as follows: psychiatric symptoms outside “clinical norm,” cognitive decline, traumatic brain injury, new onset of mental illness after age 50, initial psychotic break, alcohol abuse, seizure disorder with psychiatric symptoms, movement disorders, autoimmune disorder, eating disorders, poison or toxin

exposure, catatonia, focal neurological signs.⁴² Schizophrenia researchers are constantly expanding our understanding of this illness, and near-future clinicians will most likely routinely use neuroimaging as a diagnostic aid in the assessment of schizophrenia.

Pharmacologic Development

Another important current use of neuroimaging and schizophrenia is in the arena of drug development and discovery. Utilizing neurochemical imaging techniques such as PET, SPECT, and MRS pharmaceutical researchers are able to describe drug effects on specific neurotransmitters and their receptors.⁴³ PET and SPECT are also useful in measuring the binding profiles to receptors, such as dopamine receptors, of medications that have been radio-labeled.

Prediction of Treatment Response

Another aspect of current neuroimaging research in schizophrenia with clinical relevance involves utilizing neuroimaging to predict treatment response. Utilizing PET imaging, researchers are able to differentiate treatment responders from non-responders based on differences in cerebral metabolic response to a single dose of anti-psychotic medication.⁴⁴ SPECT researchers have also identified subgroups of schizophrenic syndromes with different treatment responses based on perfusion patterns.⁴⁵ By identifying these various sub-groups, near-future clinicians may be able to specifically choose an antipsychotic medication with the highest efficacy for that particular sub-group.