# **Functional Magnetic Resonance Imaging (fMRI):**

Functional magnetic resonance imaging, or fMRI, is a technique for measuring brain activity. It works by detecting the changes in blood oxygenation and flow that occur in response to neural activity. when a brain area is more active it consumes more oxygen and to meet this increased demand blood flow increases to the active area. fMRI can be used to produce activation maps showing which parts of the brain are involved in a particular mental process.

Functional magnetic resonance imaging (fMRI) is a relatively new procedure that uses MR imaging to measure the tiny metabolic changes that take place in an active part of the brain.

**Bennett-Salmon experiment:**

The experiment is a humorous demonstration of the problem of multiple comparisons. The fMRI community has always been aware of this problem. This experiment basically says that when we are looking at enough bits of information which is doing lots of statistical tests some will seem to be what we are looking for i.e purely by chance. Usually in fMRI experiments, there are a lot of pieces of data to compare, and without statistical correction for this phenomenon, some will indeed be significant, just by chance. This experiment clearly shows the major loop hole in the fMRI process which could have almost started a huge controversy in fMRI community.

## **Echo-Planar Imaging (EPI):**

(R L DeLaPaz,1994, Vol. 14, Issue 5) Echo-planar imaging is a fast magnetic resonance (MR) imaging technique that allows acquisition of single images in as little as 20 msec and performance of multiple-image studies in as little as 20 seconds. Such a rapid imaging technique has many advantages in MRI, such as the vast improvement in efficiency. The faster scans help to reduce motion-related artifacts and problems in MR images. The speed at which images are obtained can gives us unique insight into dynamic processes. One of the most intriguing applications of this technique is in the dynamic study of the brain activity related to blood volume changes.

EPI has not been widely used in research or clinical settings until recently because of technical limitations. EPI is very demanding on the imaging hardware because large field gradients have to be generated and switched rapidly at the rate of about 1 kHz. Another serious drawback of the method is its susceptibility to artifacts which can often result in severe distortions in the images.

**References:**

1) Handbook of Functional MRI Data Analysis

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# 2) R L DeLaPaz (september 1994). Echo-planar imaging.

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