

KING'S COLLEGE LONDON
INSTITUTE OF PSYCHIATRY, PSYCHOLOGY AND NEUROSCIENCE

MSc NEUROSCIENCE EXAMINATION

16th March 2015 at 14.00-16.30pm

Neuroimaging

B5 WRITTEN EXAMINATION

Answer FOUR questions only

1. Define T1 & T2 and why they are different in grey versus white matter? Discuss the benefits and drawbacks of measuring T1 & T2 compared to qualitative imaging.
2. Gene therapy is the genetic modification of cells to produce a therapeutic effect. In order to image gene expression in vivo with MRI, three components are essential: non-invasive imaging modality, imaging gene and imaging probe. Discuss the ideal characteristics required for each of these components for imaging gene expression in vivo.
3. Describe the two main indices extracted from diffusion tensor imaging and how they can be used in tractography or voxel-based analyses.
4. Discuss block and event-related stimulus designs in fMRI experiments describing two advantages and two disadvantages of each design.
5. Discuss three reasons why GABA is difficult to quantify in vivo and provide a brief description of a quantification method.
6. Does neuroimaging evidence support the idea that the dopamine neurotransmitter system is critically involved in all addictions?
7. Explain three different imaging techniques for examining drug effects in the brain. Discuss strengths and weaknesses of each technique.
8. How has neuroimaging improved our understanding of psychotic illness?