

**Full Time MSc Neuroscience Programme 2016-2017**  
**Titles for Essay A3**  
**Submission Deadline: 2 February 2017, at 15.00pm**

**A3.1 Systems Neuroscience**

1. In what ways may pathological and pathophysiological changes in fronto-striatal systems contribute to the executive dysfunction seen in patients with Parkinson's disease?
2. In parallel with changes in the conceptualisation of the pain experience, changes in its treatment have occurred. Provide an overview of current treatments for pain taking into account a multidisciplinary approach. In your answer you can focus on two pain syndromes using findings from the literature on the topic.
3. What is known about the neuronal circuitry underlying orientation tuning in primary visual (striate) cortex?

**A3.2 Addiction Biology**

4. Abnormalities in brain systems associated with inhibitory control may predispose some individuals to addiction. How have neuroimaging studies contributed to such findings?
5. Discuss the interplay between genetic, environmental and behavioural factors in the development of substance abuse and addiction.
6. How has optogenetics advanced our understanding of the neural substrates underlying relapse of drug use?

**A3.3 Neuropsychology of Mental Health**

7. There are no benefits to diagnosing dementia early in the course of the disease, as no disease modifying treatments are available. Critically evaluate this statement.
8. Critically appraise the evidence that schizophrenia is a neurodevelopmental disorder.
9. Discuss how studying patients with amnesia has contributed to our understanding of how the brain processes and stores human episodic long-term memory.

**A3.4 Neuroimaging**

10. Has neuroimaging improved our knowledge of neuroanatomy? Discuss.
11. A major aim of the The National Centre for Replacement, Refinement and Reduction of Animals in Research (NC3Rs) is to oversee the application and utilization of the 3Rs in the UK scientific community. Discuss, with examples, how well preclinical neuroimaging fulfills the concepts and requirements of the 3Rs.

### **A3.5 Neurodegeneration**

12. What do the genes that are linked to amyotrophic lateral sclerosis and fronto-temporal dementia tell us about the pathways that contribute to neurodegeneration in these disorders?