

Full Time MSc Neuroscience Programme 2014-2015
Titles for Essay A3
Submission Deadline: 31 March 2015, at 15.00pm

A3.1 Systems Neuroscience

1. Discuss the importance of the spinal cord in modulating pain processing.
2. Discuss recent advances in understanding the relationship between HPA axis hyperactivity and depression.
3. Why might degeneration of the substantia nigra lead to cognitive impairment in Parkinson's disease?

A3.2 Addiction Biology

4. How has optogenetics advanced our understanding on the neural substrates underlying drug addictions?
5. Addiction is sometimes referred to as a disease of learning and memory. Discuss the evidence in support of this statement and describe key experiments that offer evidence at the molecular, cellular, and behavioral level.
6. In addition to their involvement in opiate addiction, opioid receptors also play a key role in addiction to other drugs. Describe the distinct roles of these receptors in the effects of other drugs of abuse and potential therapeutic applications.
7. What is the scientific evidence from preclinical pharmacology studies that cannabis is addictive?

A3.3 Neuropsychology of Mental Health

8. Describe and appraise the evidence for the importance of epigenetics in affective disorders.
9. Discuss evidence for the hypothesis that schizophrenia has its origins in early brain development.
10. Outline the distinction between episodic and semantic memory and discuss what is known about the brain mechanisms that might support these two types of memories.
11. Discuss how the subtypes of dementia can be clinically differentiated.

A3.4 Neuroimaging

12. BOLD contrast in MRI scans is often used as a surrogate for brain activity. Evaluate the assumptions underlying this.
13. Discuss similarities and differences between preclinical and clinical neuroimaging.

A3.5 Neurodegeneration

14. Using specific neurodegenerative disease examples, illustrate the scientific basis of the protein cascade hypothesis.
15. Discuss the role of the PRNP gene and other genetic factors in influencing the incidence and transmission of prion disease.