

Full Time MSc Neuroscience Programme 2012 – 2013

Titles for Essay A3

Submission Deadline midday on 25th March 2013

A3.1 Systems Neuroscience

1. Explain the biological mechanisms by which stress can induce depressive behaviour
2. How does retinal processing accommodate the enormous range of light levels to which the eye can be exposed?
3. Compare and contrast the neural control at different levels of the motor system. The answer has to be illustrated with a valid example of a movement, and the appropriate explanation of the computational approach to the motor control.

A3.2 Addiction Biology

4. Neuroadaptations develop in response to chronic drug exposure. Taking opioids as example, explain the main molecular and cellular mechanisms underlying these processes and how they may contribute to expression of important features of addiction.
5. Describe the pharmacological mechanisms responsible for the dependence-producing effects of amphetamine, cocaine, nicotine and morphine.

A3.2 Addiction Biology

A3.3 Neuropsychology of Mental Health

6. Describe the animal models currently used to study schizophrenia and review the contribution these models have made to our understanding of this disorder.
7. What have we learned from neuroimaging about abnormalities in brain structure and function in ADHD?
8. Discuss whether the clinical diagnosis and management of dementia has significantly progressed since the initial description of Alzheimer's disease.
9. Discuss the brain systems are involved in supporting human episodic memory

A3.4 Neuroimaging

10. BOLD contrast in MRI scans is often used as a surrogate for brain activity. Comment on the assumptions underlying this.
11. Discuss the advantages and disadvantages of preclinical and clinical neuroimaging and how they can be used as translational tools between the laboratory and the clinic.

A3.5 Neurodegeneration

12. What evidence points to the polyglutamine diseases being "gain of function" diseases?
13. Several neurotransmitters are involved in the pathogenesis of Parkinson's disease. Describe their contribution to the neurodegeneration.
14. Discuss how the incidence and transmission of prion disease are controlled by the Prion protein gene (PRNP).

15. Two therapies are better than one. What is the rationale behind combination therapy for infantile NCL?