

Full Time MSc Neuroscience Programme 2014-2015
Titles for Essay A2
Submission Deadline: 17 December 2014, at 15.00pm

A2.1 Neurogenetics

1. How have the results of large scale genome wide association studies shown overlap in the aetiology of different psychiatric diagnoses?
2. Studies have identified gene X as being linked to a neurological disorder that primarily affects the hippocampus. Following preliminary in vitro studies, further work requires the generation of in vivo mouse models to more fully investigate the function of this gene, and its role in disease. Discuss the various methodologies you might use to generate these mice, and the potential advantages and drawbacks conferred by each system.

A2.2 Developmental neurobiology

3. Discuss the molecular mechanisms underlying migration defects in the developing cerebral cortex.
4. Discuss the importance of Reelin in brain development and disease.
5. Your laboratory has discovered a new vertebrate species. Devise a research program comprising three key experiments to investigate embryonic neural patterning in this organism.
6. What is the evidence that prenatal nutrition is a risk factor for schizophrenia?

A2.3 Neuronal plasticity

7. Discuss the function(s) of CaMKII (calcium/calmodulin-dependent kinase II) in long-term potentiation. Which experimental approaches have been used and what are their limitations?
8. How might current artificial neural networks be improved in the light of recent advances in neuroscience?

A2.4 Neuroimmunology

9. Discuss, using specific examples, how cytokines contribute to neurodegenerative diseases.
10. Many treatments, which have been used to successfully treat Experimental autoimmune encephalomyelitis (EAE) or chronic relapsing EAE, have failed or are unfeasible in multiple sclerosis. Discuss why this should be so.