

Full Time MSc Neuroscience Programme 2013 – 2014

Titles for Essay A2

Submission Deadline : Thursday 9 January 2014, at 15.00pm

A2.1 Neurogenetics

1. Define briefly what is meant by Genome Wide Association Studies (GWAS). Discuss, using a specific complex disease as an example, how GWAS has contributed to our understanding of complex diseases.
2. Explain the dynamic nature of the epigenome and, with examples, discuss how it may be a mediator between the genome and environment.
3. Describe the approach and methods that led to the completion of the human genome project and discuss whether the promise of the human genome project has been realized yet.
4. Discuss the rationale and approaches for analysing the transcriptome in studies of human disease. Briefly describe how it can be informative to integrate the transcriptome data with DNA derived information.
5. Discuss the various methods used to generate mouse models of neurological disorders and critically evaluate the benefits and drawbacks to each manipulation.

A2.2 Developmental neurobiology

6. Discuss how developmental mechanisms underpin mammalian binocular vision.
7. Compare and contrast two underlying principles of neural development: gradient signalling and compartment formation.
8. Down syndrome and Alzheimer's disease: An opportunity to understand an important link between development and ageing?
9. Discuss the importance of Reelin in brain development and disease?

A2.3 Synaptic plasticity

10. Discuss the function of CaMKII in long-term potentiation.
11. Assess the plausibility of learning in Hebbian and backpropagation networks.

A2.4 Neuroimmunology

12. Critically review the evidence linking cytokines and depression.
13. How are microglia involved in the pathogenesis of Alzheimer's disease?
14. Discuss the potential mechanisms by which infection can lead to autoimmunity, and evaluate any evidence that infection can trigger autoimmune disease in the CNS or PNS.