

Part Time MSc Neuroscience Programme 2012 – 2014

Titles for Essay A2

Submission Deadline midday on the 19th April 2013

A2.1 Neurogenetics

1. Explain the difference between Mendelian and non-Mendelian diseases. Using one neuropsychiatric disorder (e.g schizophrenia, ADHD, alcohol dependence, etc.) discuss the progress made so far in understanding the genetic architecture of that disorder.
2. The rapid advances in next generation sequencing suggest that in the near future it will be possible to obtain the complete genomic sequence of an individual quickly and at a modest cost. What use could this be for a psychiatric patient presenting at a clinic and their psychiatrist?

A2.2 Developmental Neurobiology

3. Describe how you could use iPSCs to help develop new drugs to treat a neurodegenerative or neuropsychiatric disease of your choice?
4. Is there evidence that neurodegenerative disorder(s) can have neurodevelopmental origin(s)?
5. Discuss the role of organisers in brain development.

A2.3 Neuronal Plasticity

6. Assess the biological plausibility of learning in Hebbian and backpropagation networks.
7. What are the functions of CaMKII (calcium/calmodulin-dependent protein kinase II) and PKMzeta (a protein kinase C isoform) for long-term potentiation?

A2.4 Neuroimmunology

8. Compare the phenotype and functions of TH1 cells, TH2 cells and TH17 cells, and discuss the recent proposal that it is TH17 cells, rather than TH1 cells that cause neuroinflammation in EAE and multiple sclerosis (MS).
9. What impact do systemic immune responses have on neurodegenerative disorders?
10. What is the evidence for subsets of microglia within the CNS and what functions do they serve ?

