

# MSc Neuroscience at the Institute of Psychiatry

## 2007 Essay titles

### Essay I

	Question	Author
1	Describe the mechanisms of microtubule-dependent transport in dendrites	Jean-Marc Gallo
2	Neural crest cells are multipotential. Discuss this statement giving examples where appropriate	Brenda Williams
3	Discuss the roles of symmetric and asymmetric division in nervous system development.	Dafe Uwanogho
4	How would you determine the total number of interneurons in the hippocampus and how might this information be useful?	Jonathan Cooper
5	Describe the role of glia in supporting action potential propagation in CNS axons.	Arthur Butt
6	Discuss the roles of signalling centres in the development of the nervous system, with particular emphasis on neural induction.	Dafe Uwanogho
7	Using two named adult-onset dementias, evaluate the evidence as to whether neurodegeneration is a shared or distinct pathogenic process.	Nadeem Khan
8	Discuss the role of sonic hedgehog in dorsal/ventral patterning in vertebrates.	Sandrine Thuret

## Essay II

	Question	Author
1	Describe the relevance of neuronal intermediate filaments to motor neuron disease.	Wendy Noble
2	Review the neurobiology of Attention Deficit/Hyperactivity Disorder (ADHD).	Katya Rubia
3	Why are inbred mice/rats a valuable tool in behavioral neuroscience?	Elke Binder
4	Discuss the molecular mechanisms and structural changes that might contribute to long term potentiation at a synapse and the transition from short term to long term memory.	John Stephenson
5	Is learning in Hebbian networks more biologically plausible than learning in Backpropagation networks?	Mike Coleman
6	What is the principle of cross correction and why is this important for the treatment of lysosomal storage disorders?	Jonathan Cooper
7	How is prion protein genotype related to pathology in Creutzfeldt-Jakob disease?	Payam Rezaie
8	Is schizophrenia a cognitive disorder?	Veena Kumari

### Essay III Deadline 30th April 2007

	Question	Author
1	How might PET (positron emission tomography) and fMRI be used together in the development of potential new drugs.	Mike Brammer
2	Discuss the evidence implicating neuregulin 1 as a susceptibility gene for schizophrenia. Is it a biologically plausible susceptibility gene?	David Collier
3	Spinal muscular atrophy due to SMN1 deletion and familial amyotrophic lateral sclerosis due to SOD1 mutation are genetic disorders that affect motor neurones. Compare and contrast them with reference to their clinical features, pattern of inheritance, and the molecular mechanisms underlying motor neurone degeneration.	Christopher Shaw
4	Why is the limbic system important for emotional regulation and how might abnormalities give rise to anxiety and depression?	Paul Morrison
5	What is the evidence for a genetic contribution to human personality. Are there any convincing molecular genetic findings linking specific genes to a human personality trait?	John Powell
6	How can knowledge about the oculomotor system be used to investigate the genetic basis of schizophrenia?	Ulrich Ettinger
7	The NMDA receptor hypofunction hypothesis of schizophrenia now rivals the dopamine hypothesis as a neurochemical model of the illness. Discuss.	James Stone
8	How can molecular imaging help us understand neurodegenerative disease?	Mike Modo

## Essay IV

	Question	Author
1	What can chronic relapsing experimental autoimmune encephalitis (CREAE) teach us about the aetiology and pathogenesis of multiple sclerosis?	David Male
2	Discuss the following statement: 'Immune reactions in the CNS are mostly irrelevant in protecting the CNS against viral infection.'	David Male
3	Describe how a cortico-striatal thalamo-cortical circuit might control normal movements and how its dysfunction might give rise to the characteristic symptoms of Parkinson's disease and Huntington's chorea. Describe how dysfunction of a related circuit might give rise to symptoms of schizophrenia symptoms.	John Stephenson
4	Discuss the structure function relationship in voltage-gated and ligand-gated ion channels.	Andrew Wong
5	How do astrocytes regulate microglial activity within the nervous system?	Payam Rezaie
6	Describe in detail the structure and function of monomeric and trimeric G proteins and how they have been investigated. Illustrate your answer by showing how the different G-proteins function in specific signal transduction cascades	Iain Campbell
7	Increased phosphorylation of a protein could be due, in principle, to increased kinase activity or to decreased phosphatase activity. Using this principle, evaluate critically the evidence of how tau becomes hyperphosphorylated in Alzheimer's disease and other tauopathies	Hugh Reynolds
8	Describe the mechanisms by which neurotrophins regulate apoptosis during neuronal development	Jean-Marc Gallo