KINGS COLLEGE LONDON

NEUROSCIENCE MSc EXAMINATION

For Internal Students of the INSTITUTE OF PSYCHIATRY King's College London

5th December 2013 at 14:00 - 16:30

PAPER A1

Answer FOUR questions only

1. What are the basic types of functional systems within the CNS and how do they exert their responses? Use examples to illustrate each system.

2. Evaluate the importance of BDNF in the adult brain.

3. How does the cell adhesion molecule, beta-catenin, drive the expression of wnt target genes?

4. Discuss the role of RNA editing in receptor function.

5. Compare and contrast the different strategies in making a 'knock out' vs. a 'knock in' mouse model.

6. How does binding of a steroid hormone to its receptor lead to changes in gene transcription?

7. Describe the main states that ion channels exist in, giving examples from voltage gated and ligand gated ion channels.

8. Describe how microdialysis can be used to study neuronal function by measurement of neurochemical concentrations. In your answers consider:
   (a) How concentrations are related to neuronal activity
   (b) The design of the microdialysis experiments
   (c) The limitations of microdialysis.

9. Discuss the mechanisms of intercellular signalling and neurotransmitter release in astrocytes.

10. Describe briefly the neural pathway from the photoreceptors in the eye to the visual cortex.

11. Describe the two pathways that regulate mitochondrial cytochrome c release to initiate caspase activation?