KING'S COLLEGE LONDON

NEUROSCIENCE MSc EXAMINATION

For Internal Students of the INSTITUTE OF PSYCHIATRY, PSYCHOLOGY AND NEUROSCIENCE King's College London

30th of October 2014 at 14:00 - 16:30

PAPER A1

Answer FOUR questions only

A1.1 Neuroanatomy and neuropathology

1. How does laminar organisation of a cortical region relate to its function?

2. Explain how oligodendrocytes myelinate axons, including the major constituents of myelin and their functions.

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

4. Describe what is meant by the terms projection fibres, commissural fibres and intracortical pathways in the adult human brain, giving a named example of each.

A1.2 Cell Biology

5. Discuss the importance of the spatial distribution of intracellular organelles in the context of gene expression and protein production.

6. Compare and contrast the structures of globular and fibrous proteins.

7. Discuss the role of the mitochondrion in the intrinsic pathway of apoptosis.

A1.3 Neurotransmission

8. Describe the events that lead to the generation of an action potential and recovery of normal resting membrane potential in a neuron. Discuss the roles and relative timing of Na+ and K+ ions and their voltage gated ion channels, leading to the absolute and relative refractory periods.

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

A1.4 Cell signalling

10. Discuss functions of BDNF during development of the nervous system.

11. What distinguishes the canonical wnt pathway from other, non-canonical, wnt pathways?