KING'S COLLEGE LONDON

NEUROSCIENCE MSc EXAMINATION

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

12TH DECEMBER 2013 at 14:00 - 16:30

PAPER A2

Answer FOUR questions only

1. Various species are used as genetic models of disease. Choose two and discuss their benefits and disadvantages as model systems.

2. Describe the role of the hidden layer in back propagation neural networks.

3. Describe the Collagen Gel assay. Thinking about the different kinds of guidance molecules, which ones are appropriate for this essay? Give examples.

4. Define the genetic terms phenotype, sex-linked, homozygous and dominant.

5. Describe four functions of DNA methylation in mammals.

6. What leukocytes are seen in the CNS during inflammation? What molecular mechanisms lead to the migration of these cells into the CNS?

7. Describe in outline the experiments that led to the discovery of the 'Four Yamanaka Factors' used to generate induced pluripotent stem cells (iPSCs).

8. Choose one neurodevelopmental disorder and explain which in vitro model relevant to the disease is -or could be- available and discuss its advantages and disadvantages versus an animal model.

9. How are cytokines involved in the ‘dampening down’ and resolution of an inflammatory response?

10. In the development of neural circuits, it is often said that 'molecular cues define and neuronal activity patterns refine'. Do you agree or disagree with this statement? Give specific examples of relevant experiments.

11. Discuss the evidence for the presence of boundaries in the hindbrain.