



The Royal College of Pathologists
Pathology: the science behind the cure

Part 1 Examination

Histocompatibility & Immunogenetics: First Paper

Tuesday March 23rd 2010

Candidates must answer FOUR questions only – Both questions in Section A and TWO questions from Section B

Time allowed THREE HOURS

Section A - Answer ALL questions

- 1 Write short notes on the relevance to clinical transplantation of:
 - a) HLA-DP
 - b) Minor histocompatibility antigens
 - c) MICA & MICB
 - d) KIR

- 2 Write short notes on the use and clinical relevance of genetic testing in THREE the following clinical scenarios:
 - a) Drug hypersensitivity
 - b) Immunosuppressive drug metabolism
 - c) Haemochromatosis
 - d) Coeliac disease

Please turn over for Section B

Section B - Answer TWO out of the following Three questions:

- 3 Describe the role of dendritic cells in the allo-immune response.

- 4
 - a) Discuss evidence for a pathological role for non-HLA antibodies in solid organ transplant rejection.
 - b) Briefly describe other immune markers associated with transplant tolerance/rejection processes, with regard to their potential diagnostic utility.

- 5 Describe the current WHO HLA nomenclature system and the new system due to be introduced in April 2010. Giving examples, discuss why a change in the current system was necessary.



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Candidates must answer FOUR questions only - ALL questions in Section A and ONE question from Section B

Time allowed THREE HOURS

Section A - Answer ALL questions

- 1 Write short notes on the H&I laboratory investigations performed for THREE of the following clinical reactions:
 - a) Platelet refractoriness
 - b) TRALI
 - c) Neonatal alloimmune thrombocytopenia
 - d) TA-GvHD

- 2 Write short notes on the following:
 - a) External quality assurance testing
 - b) Validation of new laboratory techniques
 - c) Horizontal & vertical audit

Please turn over for Section A question 3 and Section B

3 Write short notes on:

- a) the laboratory techniques available for monitoring an organ transplant recipient for the post-transplant production of donor-directed HLA specific antibodies
- b) Define the criteria that would influence your selection of technique
- c) How might the results contribute to the diagnosis of rejection
- d) How might the results influence patient management

Section B - Answer ONE out of the following Two questions

- 4 Compare and contrast current H&I laboratory tests and procedures in support of renal/pancreas, cardiothoracic and liver transplant programmes.
- 5 Discuss the role of HLA and non-HLA genes in haematopoietic progenitor cell donor selection and transplant outcome.



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Tuesday 24 March 2009

Candidates must answer all questions in Section A and TWO questions from Section B

Time allowed: 3 hours

Section A

1. In relation to renal transplantation:
 - a) Outline the main features of the two pathways of allorecognition
 - b) Briefly describe three categories of rejection in which alloantibody is implicated
 - c) Describe the contribution that laboratory testing can make to the prevention or management of humoral rejection

2. Write short notes on the value of HLA testing in **three** of the following clinical circumstances:
 - a) HIV infection
 - b) Ankylosing Spondylitis
 - c) Narcolepsy
 - d) Rheumatoid Arthritis

Please turn over for Section B

Section B

3. Compare and contrast the function of the T cell and NK cell.

4. Discuss the current approach for the allocation of kidneys and allocation of pancreata from deceased donors.

5. Discuss the role of the H&I laboratory in the provision of post-transplant monitoring services.



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Candidates must answer all questions in Section A and ONE question from Section B

Time allowed: 3 hours

Section A

1. Write short notes on the following laboratory techniques with reference to their clinical application:
 - a) Virtual crossmatching
 - b) Chimerism monitoring
 - c) Sequence based typing

2. Write short notes on the relevance of the following to quality management in the H&I laboratory:
 - a) NEQAS for H&I
 - b) EFI accreditation
 - c) CPA accreditation
 - d) Human Tissue Act 2004

Please turn over for Section A Question 3 and Section B

3. In relation to outcome following clinical allogeneic HSCT, describe the relevance of polymorphisms in the following genetic systems:
 - a) HLA molecules
 - b) Minor histocompatibility antigens
 - c) NK cell killer inhibitory receptors

Section B

4. Discuss how approaches to the clinical and laboratory management of the sensitised patient have evolved over the past decade.
5. Discuss the clinical relevance of leukocyte antibodies in reactions to blood transfusion.



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Histocompatibility & Immunogenetics: First paper

Tuesday 18 March 2008

Candidates must answer ALL questions in Section A
Candidates must answer TWO questions from Section B
Candidates must answer FOUR questions ONLY
Questions may be attempted in any order

Time allowed: 3 hours

Section A

- 1 Write short notes on:
 - a) The principles of luminex technology
 - b) The application of this technology to
 - i) HLA typing
 - ii) detection and definition of HLA specific antibodies
 - c) The advantages and disadvantages of this methodology for
 - i) HLA typing
 - ii) antibody detection and definition

- 2 Discuss the importance of accurate HLA antibody definition in the management of patients in the following clinical situations:
 - a) End stage renal failure
 - b) Aplastic anaemia
 - c) Platelet refractoriness

Please turn over for Section B (Questions 3, 4 and 5)

Section B

- 3 Describe the HLA class I and class II antigen presentation pathways and outline mechanisms employed by pathogens attempting to evade immune recognition.
- 4 You want to replace a test that has been well established in your laboratory with a new test that has been reported to measure the same analyte with increased specificity and sensitivity. Describe the procedures you would go through prior to making the change.
- 5 Discuss the advantages and disadvantages of cord blood banking and its clinical application.



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Histocompatibility & Immunogenetics: Second paper

Tuesday 18 March 2008

Candidates must answer ALL questions in Section A

Candidates must answer ONE question from Section B

Candidates must answer FOUR questions ONLY

Questions may be attempted in any order

Time allowed: 3 hours

Section A

- 1 Write short notes on the following:
 - a) The production of allogeneic antibodies
 - b) The structure of MICA
 - c) HLA null alleles

- 2 In relation to outcome following clinical allogeneic HSCT, describe the relevance of polymorphisms in the following genetic systems:
 - a) HLA molecules
 - b) Minor histocompatibility antigens
 - c) NK cell killer inhibitory receptors

Please turn over for Question 3 and Section B (Questions 4 and 5)

- 3 Write short notes on current understanding of the molecular basis for HLA associations with THREE of the following diseases:
- a) coeliac disease
 - b) insulin-dependent diabetes
 - c) ankylosing spondylitis
 - d) HIV progression

Section B

- 1 Outline the contribution of HLA alloantibody in the different categories of renal allograft rejection and discuss the role of laboratory testing in the prevention or management of humoral rejection.
- 2 Discuss clinical strategies for undertaking antibody incompatible transplantation with particular reference to the laboratory support required for such procedures



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Part 1 examination

Histocompatibility & Immunogenetics: First paper

Tuesday 27 March 2007

*Candidates must answer **ALL** questions in **Section A***
*Candidates must answer **TWO** questions from **Section B***
*Candidates must answer **FOUR** questions **ONLY***
Questions may be attempted in any order

Time allowed: 3 hours

Section A

- 1 In relation to minor (mH) histocompatibility antigens:
 - a) What are the most clinically relevant genetic systems currently known?
 - b) What are the immunological mechanisms involved in their recognition?
 - c) How can the mH be used in the development of immunotherapy protocols?

- 2 In relation to clinical allogeneic haematopoietic stem cell transplantation:
 - a) Which sources of haematopoietic stem cells (HSC) are currently used clinically?
 - b) What are the main features of each of the various sources of HSC?
 - c) How does each of the different sources of HSC influence graft rejection or the development of graft versus host disease (GVHD)?

Please turn over for Section B (Questions 3, 4 and 5)

Section B

- 3 Describe the mechanisms which may contribute to the development of chronic allograft nephropathy.
- 4 Discuss the impact of matching at the broad and allelic level for all HLA loci in solid organ and stem cell transplantation.
- 5 Discuss laboratory and clinical strategies for managing sensitised patients.



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Tuesday 27 March 2007

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*Candidates must answer **ONE** question from **Section B***

*Candidates must answer **FOUR** questions **ONLY***

Questions may be attempted in any order

Time allowed: 3 hours

Section A

- 1 Write short notes on the relevance of the Human Tissue Act to H&I laboratories in **THREE** of the following categories:
 - a) Obtaining and documenting consent
 - b) Design and performance of laboratory research projects
 - c) Clinical transplantation
 - d) Training, clinical audit and quality control

- 2 Write short notes describing the influence of HLA typing in the clinical management of **THREE** of the following conditions:
 - a) HIV infection
 - b) narcolepsy
 - c) ankylosing spondylitis
 - d) actinic prurigo

Please turn over for Section A Question 3 and Section B (Questions 4 and 5)

3 In relation to immunological reactions to blood transfusions:

- a) Describe TWO immunological reactions induced by white cells or platelets and indicate the main antigenic systems and antibodies involved
- b) What tests are available to aid their diagnosis?
- c) How can these immunological reactions be prevented?

Section B

- 4 Describe the key features of a quality management system and the contribution they make to the provision of an H&I laboratory service
- 5 Briefly outline the processes involved in attaining laboratory accreditation in Histocompatibility and Immunogenetics. Discuss similarities and differences in accreditation requirements between Clinical Pathology Accreditation and the European Federation for Immunogenetics.