



The Royal College of **Pathologists**

Pathology: the science behind the cure

Part 1 examination

Clinical Cytogenetics: First paper

Tuesday 23 March 2010

Candidates must answer FOUR questions ONLY

Time allowed: 3 hours

1. Write brief notes on the cytogenetic and molecular genetic techniques used in the investigation of:
 - a) DiGeorge syndrome
 - b) Fragile X syndrome
 - c) Chronic myeloid leukaemia

2. How can a balanced karyotype be associated with an abnormal phenotype?

3. Do you think that non-invasive prenatal diagnosis will be established as a reliable diagnostic procedure for detection of trisomy 21 within the next five years? Explain your answer.

Please turn over for Questions 4 and 5

4. Write notes on the clinical phenotype and aetiology of **THREE** of the following:
 - a) Pallister Killian syndrome
 - b) Retinoblastoma
 - c) Uniparental disomy for chromosome 14
 - d) Angelman syndrome

5. You have been asked to write best practice guidelines for cytogenetic investigation of Fanconi anaemia syndrome. What would you include? Explain the scientific basis for your decisions.



The Royal College of **Pathologists**

Pathology: the science behind the cure

Part 1 examination

Clinical Cytogenetics: Second paper

Tuesday 23 March 2010

Candidates must answer FOUR questions ONLY

Time allowed: 3 hours

1. What is mosaicism? Describe how mosaicism can be detected by both cytogenetic and molecular genetic techniques and discuss the limitations of different methods, with reference to clinically relevant situations.
2. How will the introduction of routine use of array CGH and next generation sequencing change diagnostic genetics? Briefly discuss how laboratories should deal with results of uncertain status (use as examples a copy number variant and a deep intronic single base change).
3. Give a brief explanation of sex determination in humans. Describe, with examples, how genetic causes can result in sex reversal.

Please turn over for Questions 4 and 5

4. Write reports to the referring clinician for the following karyotypes:
- a) Blood sample from a newborn with microcephaly, seizures and feeding difficulties: 46,XY,der(17)t(4;17)(p16;p13)
 - b) Amniotic fluid sample for cardiac anomaly on abnormal ultrasound scan detected at 20 weeks gestation:
46,XX,dup(8)(p23.1p23.1)
 - c) Bone marrow from an adult male patient with a diagnosis of acute myeloid leukaemia: 46,XY,der(13;15)(q10;q10),+8[10]
 - d) Lymph node from a patient with suspected non-Hodgkin lymphoma: 48,XX,+6,del(6)(q15q27),t(14;18)(q32;q21),+der(18)t(14;18)[15]

Supplement your answer with any points you may have considered but not included in your report.

5. Describe, with examples, how the application of fluorescence in situ hybridisation has improved the diagnosis and determination of prognosis in leukaemias and tumours.



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Pathology: the science behind the cure

Part 1 examination

Clinical Cytogenetics: First paper

Tuesday 24 March 2009

Candidates must answer FOUR questions ONLY

Time allowed: 3 hours

1. What are genomic disorders? Describe how they arise and illustrate your answer with **THREE** examples.

2. Write short notes on the clinical significance of **EACH** of the following:
 - a) Mosaic trisomy 20 in an amniotic fluid sample.
 - b) Age related mosaicism.
 - c) X chromosome fragile sites.
 - d) del(5q) in myeloid disorders.

3. Outline the principal technical and scientific features of microarray technologies used in the analysis of genetic disorders in a cytogenetics laboratory. Refer in your answer to the relative merits of BAC (Bacterial Artificial Chromosome), oligonucleotide and SNP (Single Nucleotide Polymorphism) microarray platforms in a diagnostic genetics laboratory.

Please turn over for Questions 4 & 5

4. Write an essay on the diagnostic and prognostic significance of the results of cytogenetic and molecular genetic testing for acquired abnormalities in the following disorders: MPD (myeloproliferative disorder), MDS (Myelodysplastic Syndrome) and AML (Acute Myeloid Leukaemia).

5. Write an essay on cytogenetic abnormalities involving the Y chromosome. Indicate the possible clinical outcomes in the examples you describe.



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Pathology: the science behind the cure

Part 1 examination

Clinical Cytogenetics: Second paper

Tuesday 24 March 2009

Candidates must answer FOUR questions ONLY

Time allowed: 3 hours

1. Outline the factors that should be taken into account when deciding whether and how a diagnostic test should be introduced into the laboratory repertoire.

2.
 - a) Explain the term 'genomic imprinting' and when does it occur?
 - b) Explain the term 'uniparental disomy' and outline the strategy for testing in a diagnostic genetics laboratory.

3. External genetic databases are becoming increasingly important to diagnostic laboratories. Critically evaluate their use and limitations illustrating your answer with **THREE** examples relevant to clinical cytogenetics.

Please turn over for Questions 4 & 5

4. Write fully interpreted reports for the referring clinician based on the findings in **EACH** of the following cases:
- Mosaic 47, XX,+9 [3]/ 46,XX [36] karyotype from a cultured Chorionic Villus Sample.
 - Mosaic 46,XX [15]/46,XY[25] karyotype from two cultures in an amniotic fluid sample obtained at 18 weeks referred with ambiguous genitalia on scan.
 - 47,XYY karyotype with a small paracentric inversion of chromosome 12, inv(12)(q22q24.1) in a postnatal blood sample from a 5 year old boy with learning difficulties.
 - Preliminary rapid testing result by Quantitative Fluorescent PCR was normal in an amniotic fluid sample. Male karyotype (55 metaphases examined), obtained from two cultures where two cells from a single culture showed 47,XY,+21.

Supplement your answer with any points you may have taken into consideration but not included in your reports.

5. Write short notes on **THREE** constitutional syndromes and **THREE** acquired disorders involving abnormalities of chromosome 11. Include relevant clinical information and what is known of the molecular basis of the abnormality in your answer.



The Royal College of Pathologists

Part 1 examination

Clinical Cytogenetics: First paper

Tuesday 18 March 2008

Candidates must answer FOUR questions ONLY

Time allowed: 3 hours

- 1
 - a) Describe what is meant by the term ‘contiguous gene deletion syndrome’
 - b) Describe the phenotypic effects of deletions within the regions in which the following contiguous deletion syndromes map:
 - 1) Wolf-Hirschorn syndrome
 - 2) Williams syndrome
 - c) **Outline the methods available for identifying contiguous gene deletions**

- 2 **Describe what is meant by the following terms and give examples of their clinical cytogenetics context:**
 - a. Non-allelic homologous recombination
 - b. Copy number neutral loss of heterozygosity (LOH)
 - c. Tertiary monosomy
 - d. biallelic trisomy (detected by quantitative fluorescence-PCR)

Please turn over for Questions 3, 4 & 5

- 3 a) Define the term 'mosaicism' in a cytogenetics context.
- b) What is the clinical significance of mosaicism in the following?
 - a. Turner syndrome
 - b. Beckwith-Wiedemann syndrome
 - c. Confined placental mosaicism
- 4 Describe the clinical features associated with the following disorders. Outline what is known about the underlying genetic disorder and describe a cytogenetic analysis strategy in the following three conditions:
 - a. Roberts syndrome
 - b. Mosaic variegated aneuploidy
 - c. Premature Chromosome Condensation (PCC) syndrome
- 5 Write short notes on the following:
 - a. JAK2 mutations in MPD (myeloproliferative disorders)
 - b. MLL-fusion genes in acute leukaemia
 - c. leukaemia in Down syndrome
 - d. RUNX1 (AML1)-fusion genes in acute leukaemia



The Royal College of Pathologists

Part 1 examination

Clinical Cytogenetics: Second paper

Tuesday 18 March 2008

Candidates must answer FOUR questions ONLY

Time allowed: 3 hours

- 1 **Describe the role of external agencies in ensuring the quality of service delivery provided by Genetics Laboratories**

- 2 Write short notes on the following:
 - a) Non-invasive prenatal detection of trisomy 21 using cell free fetal nucleic acid
 - b) Preimpantation diagnosis of a familial translocation
 - c) Postnatal diagnosis of ICF syndrome

Illustrate your notes with diagrams as appropriate.

- 3 Describe the role of the cytogenetics laboratory in the monitoring of treatment in chronic myeloid leukaemia.

Please turn over for Questions 4 & 5

- 4 Write fully interpreted reports for the referring clinician for the following cases:
- a) A 35 yr old woman referred for recurrent miscarriage with low level (<10%) sex chromosome aneuploidy.
 - b) A midtrimester amniotic fluid sample is received from a fetus with a heart defect and a Down syndrome screen risk of 1:50. Karyotype shows: 46,X,+21[6]/47,XX,+21[34] in two cultures.
 - c) A phenotypically male fetus with holoprosencephaly on scan. Chromosome analysis shows 45 chromosomes (monosomy X) with SRY identified by FISH on the short arm of chromosome 18.
 - d) A child with postnatal growth failure, developmental delay, brain abnormalities, dysmorphism and syndactyly with a normal karyotype result. MLPA (multiplex ligation-dependent probe amplification) studies show deletion of the sub-telomeric region of chromosome X/Yp and duplication of the sub-telomeric region of chromosome X/Yq .

Supplement your answer with any additional aspects you may have taken into consideration but which you have not included in your report.

- 5 Write short notes on three constitutional and three acquired chromosome abnormalities involving chromosome 17. Include relevant clinical information and what is known of the molecular basis of the abnormality in your answers.



The Royal College of Pathologists

Part 1 examination

Clinical Cytogenetics: First paper

Tuesday 27 March 2007

Candidates must answer FOUR questions ONLY

Time allowed: 3 hours

1. Explain the principles underlying the following techniques, illustrate with examples of application in a clinical cytogenetics service:
 - a. C-banding
 - b. Multiplex ligation dependent probe amplification
 - c. Sister chromatid exchanges
 - d. Fluorescence in situ hybridisation using unique sequence probes
2. What is X-inactivation, how is it mediated, and for what purpose? How, using cytogenetic and molecular genetics methods, can X-inactivation status be assessed in a female? How can skewed X-inactivation lead to disease?
3. Explain the relationship between particular types of DNA repeat sequences and recurrent structural chromosome abnormalities. Illustrate with examples of constitutional abnormalities.

Please turn over for Questions 4 and 5

4. Describe the clinical features and genetic causes associated with the following karyotypic findings. What are the main differential diagnoses?
 - a. 46,XX karyotype in a phenotypic male
 - b. 46,XY karyotype in a phenotypic female

5. Describe the disease and cytogenetic/molecular defects in the following:
 - a. Burkitt's lymphoma
 - b. Infant leukaemia
 - c. Multiple myeloma



The Royal College of Pathologists

Part 1 examination

Clinical Cytogenetics: Second paper

Tuesday 27 March 2007

Candidates must answer FOUR questions ONLY

Time allowed: 3 hours

1. A recent report evaluating the use of array comparative genomic hybridisation (aCGH) in the investigation for idiopathic learning disabilities suggests it should be considered as a first line investigation.
Describe the issues, (biological, scientific, and technical) which would need to be taken into consideration prior to a CGH as a first line investigation being introduced for these patients into a diagnostic genetics laboratory.
2. Describe the screening options available to achieve a detection rate for Down Syndrome greater than 75% with a false positive rate of 3%. How would the choice of these options by obstetricians affect prenatal diagnoses referrals to a cytogenetics laboratory?
3. Discuss the diagnostic and prognostic value of identifying acquired cytogenetic abnormalities in acute leukaemias.

Please turn over for Questions 4 and 5

4. Write fully interpreted reports for the following findings:
- a. A mosaic supernumerary bisatellited marker chromosome in a PHA stimulated culture of a blood sample from a child with developmental delay, which is shown by fluorescence in situ studies to be derived from chromosome 22
 - b. Mosaicism for chromosome 14 in a cultured chorionic villus sample referred with a positive first trimester Down screening result
 - c. 10% of metaphases from a blood sample from an infant with unexplained neurological problems show rearrangements involving 7, 14 and X
 - d. A 46,XY karyotype in a cultured postnatal fetal skin tissue sample which was referred for confirmation following a rapid prenatal test result (for copy number of chromosomes 13, 18 and 21) on uncultured chorionic villi which indicated trisomy 18.

Supplement your answer with any additional aspects you may have taken into consideration but which you have not included in your report.

5. Your service commissioners are undertaking a review of cytogenetic services and have invited you to write a report detailing what changes/developments in services and workforce can be expected in 5 years time. What developments and improvements would you put into your report and why?



THE ROYAL COLLEGE OF PATHOLOGISTS

Part 1 Examination

Tuesday 14 March 2006

CLINICAL CYTOGENETICS

First Paper

Candidates must answer FOUR questions ONLY

Time allowed - THREE HOURS

- 1 Define imprinting and describe what is understood about underlying molecular mechanisms regulating imprinting. Give examples of how imprinting can result in genetic disease.

- 2 Explain the molecular genetics of fragile X syndrome and describe the cytogenetic (including molecular cytogenetic) and molecular genetic approaches to the investigation of the syndrome.

- 3 Write short notes on three of the following.
 - a) Retinoblastoma
 - b) Mantle cell lymphoma
 - c) Smith-Magenis syndrome
 - d) Williams syndrome

Please turn over for Questions 4 and 5

- 4 Describe how you would interpret the following scenarios:
- a) 45,X/46,XX in a cultured blood sample in a female with a history of recurrent miscarriage
 - b) Mosaicism for chromosome 16 in a cultured amniotic fluid referral for positive maternal serum screen test
 - c) Random aneuploidy in a cultured blood sample from a child with growth retardation
- 5 Discuss, with examples, how genetic testing can contribute to the investigation of acute myeloid leukaemia (AML). Discuss the diagnostic and prognostic importance of the results of the tests carried out.



THE ROYAL COLLEGE OF PATHOLOGISTS

Part 1 Examination

Tuesday 14 March 2006

CLINICAL CYTOGENETICS

Second Paper

Candidates must answer FOUR questions ONLY

Time allowed - THREE HOURS

- 1 What are the key managerial, certification and scientific requirements for maintaining a robust diagnostic service for cytogenetics and molecular genetics?
- 2 Discuss recent advances in technology that have been made in screening for cryptic chromosome rearrangements in patients with idiopathic learning disability.
- 3 Discuss the current options available for the screening of Down syndrome. What impact will or could they have on the service provided by a cytogenetics laboratory?
- 4 Automated techniques are being increasingly introduced into cytogenetic laboratories. Discuss what processes are amenable to automation and the advantages and disadvantages of introducing doing this.
- 5 Write an essay on the genetics of Fanconi's anaemia and describe the diagnostic testing strategy.



THE ROYAL COLLEGE OF PATHOLOGISTS

Part 1 Examination

Tuesday 15 March 2005

Clinical Cytogenetics

First Paper

Candidates must answer FOUR questions ONLY

Time allowed - THREE HOURS

1. Explain the meaning of FIVE of the following terms, illustrating your answer with examples of human genetic disorders and explaining the underlying mechanisms:
 - a) Anticipation
 - b) Penetrance
 - c) X inactivation
 - d) Mitochondrial inheritance
 - e) Uniparental disomy
 - f) Tertiary trisomy

2. Describe a strategy for the genetic testing of Acute Lymphoblastic Leukaemia. Discuss the diagnostic and prognostic importance of the results of the tests carried out.

Please turn over for Questions 3, 4 and 5

3. Describe the reported cytogenetic abnormalities involving chromosome 22 and discuss their clinical significance, giving a range of examples from constitutional and malignancy related investigations.
4. Give an account of normal variation in the human genome.
5. Give an account of the genetic and cytogenetic causes of complete and partial sex reversal including sexual ambiguity.



THE ROYAL COLLEGE OF PATHOLOGISTS

Part 1 Examination

Tuesday 15 March 2005

Clinical Cytogenetics

Second Paper

Candidates must answer FOUR questions ONLY

Time allowed - THREE HOURS

1. Describe causes of potential technical error within either a diagnostic molecular genetics or cytogenetics laboratory and the measures you would put into place to avoid them.
2. Describe the main health and safety issues in the design and operation of a Clinical Cytogenetics laboratory.
3. You have been asked to produce a development plan for your service for the next five years. With reference to either constitutional or haematological cytogenetics, discuss the changes in the service that you predict and provide justification for any proposed developments.
4. You have been asked to give a presentation to the staff of your local miscarriage clinic covering the chromosomal contribution to miscarriage and the likelihood of the same abnormalities resulting in a live birth. Write out a draft of your presentation.

Please turn over for Question 5

5. The detection of mosaicism in prenatal diagnostic testing can give rise to difficulties in interpretation. In the cases of mosaic trisomy at CVS and amniocentesis discuss the different types of mosaicism that can occur, the follow up tests that would be appropriate and the implications of the possible findings.



THE ROYAL COLLEGE OF PATHOLOGISTS

Part 1 Examination

Tuesday 16 March 2004

CLINICAL CYTOGENETICS

First Paper

Candidates must answer FOUR questions ONLY

Time allowed - THREE HOURS

1. Describe what methods are available to investigate copy number changes of genes and chromosomes, citing examples. Discuss the relative advantages and disadvantages of the methods.
2. Describe the different types of genetic mosaicism and discuss the aetiology for each type.
3. Describe reported cytogenetic abnormalities involving chromosome 8 and discuss their clinical significance, giving a range of examples from constitutional and acquired investigations.
4. Describe all the factors you would consider when evaluating and interpreting the following scenarios:
 - a) Reciprocal translocation in a recurrent miscarriage referral
 - b) Marker chromosome in a maternal age amniotic fluid referral
 - c) Chromosome 2 mosaicism in a long term CVS culture, with no direct culture processed.

Please turn over for Question 5

5. EITHER

Write short notes on the clinical phenotype, chromosome abnormality and method of diagnosis in 4 of the following:

- a) Beckwith-Wiedemann syndrome
- b) Roberts syndrome
- c) Cat eye syndrome
- d) Pallister-Killian syndrome
- e) Ring X chromosome

OR

Write short notes on the disease and the cytogenetic/ molecular genetic abnormality in 4 of the following:

- a) follicular lymphoma
- b) Ewing's sarcoma
- c) Philadelphia positive acute lymphoblastic leukaemia
- d) Secondary (therapy related) leukaemia
- e) Infant leukaemia



THE ROYAL COLLEGE OF PATHOLOGISTS

Part 1 Examination

Tuesday 16 March 2004

CLINICAL CYTOGENETICS

Second Paper

Candidates must answer FOUR questions ONLY

Time allowed - THREE HOURS

1. What are the principles and practice of internal laboratory audit for a diagnostic genetics laboratory? Describe in detail how you would set up and carry out a laboratory audit.
2. Discuss the ethical issues that should be considered when offering genetic testing.
3. All diagnostic laboratories aspire to operate with minimal risk (to the patient or within the laboratory). Discuss the minimisation of risk, considering risk in the broadest sense.
4. Your laboratory currently performs prenatal diagnosis using closed suspension cultures and turnaround times are approximately 14 days. Your clinicians are requesting a faster service. You have been asked to compare the relative merits of investing in:
 - a) change of practice to reduce full karyotyping turnaround times
 - b) developing a rapid aneuploidy screening service eg by FISH or molecular genetics

Present your appraisal of these options, describing the advantages and disadvantages of each approach.

Please turn over for Question 5

5. Your laboratory success rates and turnaround times have been declining over recent months in both your prenatal and haematological malignancy sections. Select either the prenatal or haematological malignancy section and describe how you would tackle the problem.



THE ROYAL COLLEGE OF PATHOLOGISTS

Part 1 Examination

Tuesday 18 March 2003

CLINICAL CYTOGENETICS

First Paper

Candidates must answer FOUR questions ONLY

Time allowed - THREE HOURS

1. Indicate how Clinical Cytogenetics (including Molecular Cytogenetics) has been used as a key technique to identify disease gene loci, illustrating your answer with relevant clinical examples.
2. Write an essay on chromosome instability (“breakage”) syndromes.
3. Describe the phenomenon of “X inactivation”. How do you account for the fact that females with a 45,X karyotype have a clinical phenotype?
4. Describe the aetiology of Uniparental Disomy, and give examples of its role in human genetic disease.
5. **EITHER**
A recent textbook about Human Chromosomes includes the statement “Given the frequencies of nondisjunction and chromosome loss throughout life, we are all mosaics to some degree”. Discuss the cytogenetic evidence for and against this statement.

OR

Write short notes on the mechanisms and cytogenetic applications of any three of the following:

- (a) Whole Chromosome FISH (“Chromosome Painting”)
- (b) Replication Banding
- (c) C-Banding
- (d) Comparative Genomic Hybridisation



THE ROYAL COLLEGE OF PATHOLOGISTS

Part 1 Examination

Tuesday 18 March 2003

CLINICAL CYTOGENETICS

Second Paper

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

Time allowed - THREE HOURS

1. In laboratory diagnostic genetics, relate the roles of internal quality control, external quality assessment and accreditation by external agencies.
2. Discuss which diagnostic techniques could be improved or introduced by automation in a Clinical Cytogenetics Laboratory. What advantages and disadvantages does automation provide?
3. How would you evaluate the clinical effectiveness of different approaches to prenatal cytogenetic diagnosis?
4. Write an essay on the prognostic value of acquired structural cytogenetic abnormalities in acute leukaemias and solid tumours.
5. Discuss the relative advantages and disadvantages of (i) G-band analysis, (ii) M-FISH or SKY, and (iii) FISH with a set of sub-telomeric probes, as alternative methods to investigate couples with recurrent miscarriage or infertility.



THE ROYAL COLLEGE OF PATHOLOGISTS

Part 1 Examination

March 2002

CLINICAL CYTOGENETICS

First Paper

Candidates must answer FOUR questions ONLY

Time allowed – THREE HOURS

1. Write short notes on the cytogenetic (including molecular cytogenetic) and molecular genetic approaches to the investigation of:
 - (a) Fragile X syndrome ,
 - (b) Prader-Willi and Angelman syndromes,
 - (c) Type 1A Charcot-Marie-Tooth Disease/Hereditary Neuropathy with Liability to Pressure Palsies.
2. Write an essay on the numerical and structural chromosome abnormalities associated with complete or partial sex reversal.
3. Discuss, with examples, how molecular cytogenetic techniques can contribute to the investigation of leukaemia and solid tumours.
4. Describe the composition, behaviour, and function of the chromatin associated with the bands revealed by C, G and R banding.

[Turn over

5. **EITHER**

Write short notes on any three of the following:

- (a) Deletion 1p36.3 syndrome
- (b) Euchromatic variants of 16p11.2
- (c) ICF syndrome
- (d) Reciprocal translocation $t(11;22)(q23;q11)$.

OR

Write short notes on the type and prognostic significance of the cytogenetic rearrangements associated with any three of the following:

- (a) Philadelphia chromosome negative chronic myeloid leukaemia
- (b) Neuroblastoma
- (c) Multiple myeloma
- (d) Chronic lymphocytic leukaemia.



THE ROYAL COLLEGE OF PATHOLOGISTS

Part 1 Examination

March 2002

CLINICAL CYTOGENETICS

Second Paper

Candidates must answer FOUR questions ONLY

Time allowed – THREE HOURS

1. Write short notes on the various cytogenetic (including molecular cytogenetic) and molecular genetic approaches to assessing genomic copy number.
2. Discuss the observation that the majority of constitutional chromosome abnormalities are numerical, whilst many of the key oncogenetic acquired chromosome rearrangements in leukaemia and lymphoma are structural.
3. Describe, with specific examples, the processes that contribute to quality assurance in a diagnostic clinical cytogenetics laboratory.
4. You have been asked to show a group of undergraduate genetics science students around your cytogenetics laboratory. How would you describe the benefits that your laboratory service provides to patients? One of the undergraduates asks a question about the applications of microarray technology. How would you explain the possible advantages and disadvantages of conventional G-band analysis versus microarray approaches?

[Turn over

5. Describe the structure of the human sub-telomeric region and the methods by which sub-telomeric rearrangements may be detected. How would you apply sub-telomeric testing to your local population? How do you account of the fact that the frequency of sub-telomeric rearrangements found in different published series varies from 0% to 23.5% of patients investigated?

Part 1 Examination

March 2001

CLINICAL CYTOGENETICS

First Paper

Candidates must answer FOUR questions ONLY

Time allowed - THREE HOURS

1. Discuss the roles of the following in human cancer and/or leukaemogenesis:
 - (ii) p53 (Tumour Protein 53)
 - (iii) MLL (Myeloid/Lymphoid Leukaemia gene)
 - (iv) bcr.abl (breakpoint cluster region/Abelson leukaemia).
2. With reference to specific examples explain how low copy repeats or duplicons give rise to structural abnormalities and indicate their pathological consequences.
3. How can uniparental disomy arise? In what circumstances would you test for this phenomenon?
4. Write an essay on genetic recombination and the origin of the extra chromosome in human trisomies.
5. Write an essay on the mechanism and consequences of X chromosome inactivation in humans.



THE ROYAL COLLEGE OF PATHOLOGISTS

Part 1 Examination

March 2001

CLINICAL CYTOGENETICS

Second Paper

Candidates MUST answer the first question in the separate answer book provided and any THREE of the remaining FOUR questions

Time allowed - THREE HOURS

1. You have been invited to contribute to a regional Specialist Commissioning review. How would you justify the service that a diagnostic genetic laboratory provides? In light of the publication of the human genome sequence data, what improvements and developments of the service over the next 5 years would you request and why?

2. Explain what is meant by clinical audit. Describe, with specific examples, how it could be applied to diagnostic clinical cytogenetic laboratory services.
3. Indicate which categories of pregnancy might be regarded as of high risk for a chromosome abnormality? What diagnostic procedures would you recommend for these pregnancies? Discuss the problems that might be associated with the different procedures recommended.
4. Describe the genetic tests that would be appropriate in the diagnosis of male infertility. How do the abnormalities found in these tests relate to the causes of infertility?
5. Discuss appropriate strategies for following up the detection of a supernumerary marker chromosome. What factors influence the final decision on whether the marker is of clinical significance?