Teaching in Clinical Course
1996-1998
CLINICAL LABORATORY SCIENCES
Clinical Laboratory Sciences incorporates the divisions of Clinical Chemistry, Haematology, Immunology, Microbiology and Pathology.

This document tells you about the teaching in clinical laboratory sciences during the whole of the clinical course. It covers all teaching from semester 6 through middle year into year 5. It is issued as a single document at this stage to let you see the scope of teaching and to help you plan your work and revision in these areas.

The lists of objectives in this document should not be regarded as a finite description of the work to be undertaken for examinations but as a general description of the areas to be covered for this purpose. Students are expected to develop skills in self-learning which will make them aware of important advances in the clinical and laboratory aspects of medicine.

Teaching is arranged locally and will be timetabled differently at each hospital site so you will need to look at local noticeboards in each hospital to find out the place and time teaching will occur.

For local timetable enquiries please see the clinical teaching coordinator at your hospital site. In case of specific difficulty with aspects of teaching you can contact teaching coordinators for each division of Clinical Laboratory Sciences.

Clinical Chemistry: Dr. Linda Morgan at Queen’s Medical Centre.
Haematology: Dr. Andy Haynes at City Hospital.
Immunology: Dr. Moira Thomas at Queen’s Medical Centre.
Microbiology: Dr. Will Irving at Queen’s Medical Centre.
Pathology: Prof Jim Lowe at Queen’s Medical Centre.

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Clinical Chemistry

Outline of teaching
Many of the biochemical and pathophysiological processes which provide the rationale for clinical chemistry tests are introduced during the first four semesters of the medical course. During the clinical part of the course, students are constantly exposed to clinical chemistry results where they relate to patient management. They are encouraged to become familiar with normal and abnormal results profiles in this context and to seek guidance from clinical teachers on appropriate requesting and interpretation of biochemical investigations for individual patients under their care. This teaching is underpinned by seminars in clinical chemistry held during semester 6 and year 5. Wherever possible the teaching is illustrated by patients’ results and in year 5 by a workbook containing interpretive exercises and self-tuition.

Teaching in Semester 6
- Lecture
  Interpretation of clinical chemistry tests
- Seminars
  3 seminars on liver function tests, the clinical chemistry of diabetes and hypoglycaemia, and thyroid function testing. These sessions are timetabled to coincide with corresponding topic teaching in the Introductory Course.
- Assessment
  MCQ questions at end of introductory medicine and surgery

Teaching in Year 5
- Seminars
  5 seminars covering routine clinical chemistry tests, including electrolyte and water homeostasis, acid-base balance, endocrine tests, liver function and clinical enzymology.
- Workbook
  A workbook of clinical chemistry data interpretation exercises for self-assessment is distributed to all students.
- Assessment
  A formative viva is held approximately 3 weeks before the OSCE examinations. Clinical chemistry is assessed at the end of the senior medicine/surgery attachment as part of the CLS MCQ paper. Results may be presented for data interpretation in the OSCE examination.

Clinical Chemistry Course Objectives

General objectives
- to understand the biochemical and pathophysiological processes underlying clinical chemistry;
- to recognise which tests are useful in common clinical situations;
- to develop interpretive skills in clinical chemistry. The course is designed to equip the student with the skills required by a pre-registration house officer.
Specific objectives
By the end of the 5th year, students should be able to:

- Describe the causes of hypo- and hyper-natraemia, and appropriate investigations.
- Describe the causes of hypo- and hyper-kalaemia, and the emergency treatment of hyperkalaemia.
- Describe the causes of hypo- and hyper-calcaemia, and appropriate investigations.
- Describe the causes of hypoglycaemia, appropriate investigations, and emergency treatment.
- Describe the biochemical features of diabetic ketoacidosis
- Describe the role of glycated haemoglobin and fructosamine measurements in the management of diabetes mellitus
- Recognise the characteristic thyroid function tests associated with hyperthyroidism and primary and secondary hypothyroidism. Describe appropriate tests for monitoring patients being treated for thyroid disease.
- Understand the rationale underlying the investigation of Cushing’s syndrome and hypoadrenalism.
- Describe the liver function test profiles characteristic of pre-hepatic jaundice, hepatic parenchymal disease, and obstructive jaundice.
- Recognise the blood gas and bicarbonate profiles associated with metabolic acidosis and alkalosis, and respiratory acidosis and alkalosis.
- Describe and explain the clinical chemistry findings in acute and chronic renal failure.
- Describe the characteristic changes in creatine kinase, AST, and lactate dehydrogenase and their isoenzymes following myocardial infarction. Describe other conditions which may affect the plasma concentrations of these enzymes.
- Describe the causes of hyperamylasaemia.
- Discuss the significance of hypercholesterolaemia and hypertriglyceridaemia.
- Discuss the role of biochemical tumour markers in the diagnosis and management of malignant disease.

RECOMMENDED READING

The recommended textbook is W.J.Marshall’s Illustrated Textbook of Clinical Chemistry.

Preparation for House Officer Training
Seminar: Use of laboratory services

Clinical chemistry will present a session during a 60-90 minute seminar covering all the CLS disciplines. Objectives for this part of the course will be covered in a separate handout issued during the session.
OUTLINE OF TEACHING IN HAEMATOLOGY

Haematology teaching in the clinical part of the course builds upon work done in the preclinical course related to structure and function of blood cells and blood clotting. During the clinical part of the course, students are constantly exposed to haematology results where they relate to patient management. They are encouraged to become familiar with normal and abnormal results profiles in this context and to seek guidance from clinical teachers on appropriate requesting and interpretation of haematology investigations for individual patients under their care. This clinical teaching is underpinned by specific lectures and seminars in haematology held during semester 6 and year 5.

TEACHING IN SEMESTER 6

• Lectures and directed reading
  2 sessions in topic teaching on interpretation of full blood count, anaemia and changes in white cells. Bleeding disorders and coagulation.
• Assessment
  MCQ questions at end of introductory medicine and surgery

TEACHING IN YEAR 5

• Seminars and directed reading
  five seminars presented which cover areas in objectives for this part of the course
• Assessment
  A formative viava is held approximately 3 weeks before the OSCE examination. Haematology is assessed at the end of the senior medicine/surgery attachment as part of the CLS MCQ paper. Results may be presented for data interpretation in the OSCE examination.

GENERAL OBJECTIVES

The aim of haematology teaching will be to provide:
• An understanding of the normal structure and function of the haemopoietic system and consequent pathophysiological changes in haematological disease
• A background understanding of the haematological consequences of systemic disease
• A rational approach to the use and interpretation of diagnostic haematology leading to a practical base for the preregistration house year and postgraduate education/training

DETAILED OBJECTIVES

Semester 6
• Revise basic aspects covered earlier in the medical course
• Interpret the commonly requested diagnostic haematology tests
• Be able to assess a patient who has anaemia
• Be able to assess leucocytosis
• Describe ABO blood groups and their significance in transfusion
• Outline the pathophysiology and diagnosis of multiple myeloma and chronic lymphatic leukaemia
Learning Points

- Descriptive abnormalities on blood films
  - Red cell changes
  - Features and causes of pancytopenia
  - Features and causes of a leucoerythroblastic film
- Classification of anaemia
- Interpretation of anaemia
  - Causes of microcytic anaemia
  - Causes of macrocytic anaemia
  - Pathophysiology and diagnosis of B12/folate deficiency including pernicious anaemia
  - Diagnosis of iron deficiency
  - Causes of normocytic anaemia
- Assessment of the full blood count
  - Causes of neutrophilia
  - Causes of neutropenia
  - Causes of lymphocytosis
  - Causes of eosinophilia
  - Causes of basophilia
  - Causes of monocytosis
  - Causes of thrombocytosis
  - Causes of thrombocytopenia
- Mechanism and causes of a raised ESR
- Mechanisms of normal haemostasis
  - Describe tests to assess
  - Recognise patterns of abnormalities
- Biology of ABO blood groups - principles in requesting blood
- Clinical features, pathophysiology and diagnosis of myeloma
- Clinical features, pathophysiology and diagnosis of chronic lymphatic leukaemia

READING LIST


Clinical Medicine: Kumar and Clarke. Bailliere Tindall: Chapter Six

YEAR 5

TEACHING IN YEAR 5

General objectives

To consolidate and extend the principles of haematology gained earlier in the course. Areas of practical importance in the day to day practice of medicine will be emphasised. All students should attend at least one Outpatient session.

BASIC HEMATOLOGY

- Descriptive abnormalities on blood films
  - Red cell changes
  - Features and causes of pancytopenia
  - Features and causes of a leucoerythroblastic film
- Causes of numerical abnormalities in white cells and platelets
- Structure and function of normal haemoglobin
RED CELLS
• Iron: metabolism and assessment of iron status. Clinical features, diagnosis, investigation and treatment of iron deficiency
• B12/Folate: absorption and metabolism. Clinical features and laboratory abnormalities in megaloblastic anaemia. Treatment features of pernicious anaemia. Other causes of macrocytosis
• Anaemia of chronic disease - causes and pathophysiology
• Erythropoietin - physiology and uses
• Thalassaemia- clinical features and laboratory diagnosis
• Sickle cell disease - clinical feature and laboratory diagnosis. Types and management of crises. Sickle cell screening and surgery
• Polycythaemia- causes and pathophysiology clinical features and diagnosis of polycythaemia rubra vera
• Sideroblastic anaemia -causes, laboratory diagnosis and clinical features

WHITE CELLS
• Acute leukemia - clinical features and laboratory diagnosis. Distinction between myeloid and lymphoid. Differences between adults and children. General principles of treatment
• Chronic myeloid leukaemia - clinical and laboratory features. Principles of management.
• Chronic lymphatic leukaemia - clinical and laboratory features. Principles of management
• Multiple myeloma -clinical features and diagnosis. Associated laboratory abnormalities. Principles of management.
• Lymphoma - causes of lymphadenopathy. Clinical features. Hodgkin’s and non Hodgkin’s. High and low grade

HAEMOSTASIS
• Interpretation of laboratory tests - investigation of easy bruising
• Liver disease - role of vitamin K in normal clotting clotting. Abnormalities and bleeding in liver disease.
• Warfarin - clinical use, pharmacokinetics and overanticoagulation
• Heparin - clinical use, pharmacokinetics and overanticoagulation
• Thrombolysis - clinical use, monitoring and complications
• Thromboembolism - clinical features and diagnosis. Thrombophilia; who, when and how to screen. Prophylactic anticoagulation
• Disseminated intravascular coagulation - clinical features, diagnosis and management

TRANSFUSION
• Blood groups in clinical practice
• Principles of cross matching blood
• Transfusion - products for transfusion. Causes and investigation of a suspected transfusion reaction. Other hazards
• Treatment of massive blood loss
• Rational use of fresh frozen plasma, cryoprecipitate and platelets
MISCELLANEOUS

- Myeloproliferative disease - myelofibrosis and thrombocythaemia. Clinical features and laboratory diagnosis
- Aplastic anaemia - clinical features, laboratory diagnosis and principles of management

- MANAGEMENT OF THE SPLENECTOMISED PATIENT

- IMMUNE THROMBOCYTOPENIA

SUGGESTED READING


Clinical Medicine: Kumar and Clarke. Bailliere Tindall: Chapter Six

PHO Course

Preparation for House Officer Training

Seminar: Use of laboratory services

Haematology will present a session during a 60-90 minute seminar covering all the CLS disciplines. Objectives for this part of the course will be covered in a separate handout issued during the session.
IMMUNOLOGY

OUTLINE OF TEACHING
Clinical immunology is a clinical and laboratory discipline dealing with the study, diagnosis and management of patients with diseases or disease processes resulting from disordered immunological mechanisms, and conditions in which immunological manipulations form an important part of therapy and/or prevention.

The immunology teaching in the clinical part of the course is based upon the strong grounding in basic immunology, mechanisms of immunopathology and mechanisms of immune manipulation provided by the teaching course in semesters 2-5. This knowledge will be assumed and may be examined in the later parts of the course.

The teaching programme aims to provide the necessary expertise and experience required to practice as a pre-registration house officer and to provide a foundation for postgraduate continuing medical education. Many aspects of clinical immunology are included in other parts of the medical course - students will be expected to integrate knowledge and skills from these various courses.

During the clinical part of the course, students will be exposed to immunology results where they relate to patient management. They are encouraged to become familiar with normal and abnormal results profiles in this context and to seek guidance from clinical teachers on appropriate requesting and interpretation of immunology investigations for individual patients under their care. This teaching is underpinned by lectures in immunology held during semester 6 and year 5.

Teaching in Introductory Medicine & Surgery
Clinical immunology teaching in semester 6 is intended to provide a basis/framework for immunological topics in the next 3 years. This teaching is delivered in the form of a lecture.

General Objectives:
• to develop an understanding of the direct application of immunology to clinical disease and how clinical immunology may help the clinician with respect to patient management

• to become broadly familiar with the integrated use of history, physical examination and laboratory tests to assess the working of the immune system in individual patients

Teaching in Year Five
Clinical immunology teaching during this period is intended to help students gain a wider breadth of knowledge of clinical immunology. Modes of learning during these years will include directed reading and lectures during year five. It is expected that students will also learn from their exposure to immunological topics during other parts of the clinical course.
General Objectives:
• to develop a more detailed understanding of the immunopathological basis of disease
• to develop a practical understanding of how immunological principles may be applied directly to the diagnosis, assessment of prognosis, follow up and management of patients
• to become familiar with the indications for and the interpretation of common immunological investigations

Assessment after Year Five
A formative viva will be held approximately 3 weeks before the OSCE examination. Testing of knowledge of immunology will be integrated into the CLS MCQ examination and OSCE examination in Year 5.

DETAILED OBJECTIVES
At the end of year five students should be able to:

• describe the indications for and interpretation of the following investigations - C reactive protein, serum immunoglobulins, serum and urine electrophoresis, complement levels, autoantibodies, total and specific IgE levels, lymphocyte phenotyping, skin prick and patch testing

• describe the classification, features and principles of investigation and management of immunodeficiency including HIV infection

• describe the classification, features and investigation of lymphoproliferative disorders

• describe the features, immunopathology, investigation and principles of management of connective tissue disease including systemic lupus erythematosus

• describe the features, immunopathology, investigation and principles of management of vasculitis and glomerulonephritis

describe the features, immunopathology and investigation of the following organ specific autoimmune diseases - autoimmune thyroid disease, insulin dependent diabetes mellitus, pernicious anaemia, Addison’s disease, autoimmune liver disease, bullous skin diseases

• describe the features, immunopathology, investigation and principles of management of coeliac disease

• describe the features, immunopathology, investigation and principles of management of asthma, eczema, anaphylaxis, urticaria and angioedema

• outline the principles, benefits and risks of immunisation

• describe the ways in which the immune system may be manipulated therapeutically
RECOMMENDED READING

Concentrate on immunopathological aspects and laboratory investigation

For further reading see Essentials of Clinical Immunology, Chapel & Haeney, 3rd edition

Kumar & Clark
Clinical Medicine
3rd edition

Souhami & Moxham
2nd edition

Reeves & Todd
3rd edition

Basic components 126-140,334-6 83-91,1050-1 3-140
Mechanisms of damage 147-149 93-96 198-228
Immunodeficiency 140-147 92-93 174-197
HIV 96-105 243-246 165-173
Leukaemias/lymphoma 360-372 1081-1083 1085-1097 241-259
Paraproteins / myeloma 372-374 1098-1102
Anaphylaxis 716,737-9 94
CT disease/vasculitis 387-394 993-1004 1023-33,1043-4
Glomerulonephritis 445-453,480 816-824
Organ specific autoimmune disease
-thyroid disease 802-3,807-8 684-5,687-691
-Addison’s disease 813-814 699-700
-insulin dept diabetes 830-833 744-747
- pernicious anaemia 305-307 1054-1055
-autoimmune liver disease 259-260,268-9 639-642
Immune mediated skin disease 996-999 1136-1141 1003-1005 1144-1147 1009-1011
Immune mediated lung disease 667-675 479-484 687-689 500-505 694-696 508-509
Coeliac disease (and DH) 208-210 576-580
Inflammatory bowel disease 215-220 591-599
Investigation s( general) 149-50,381-3 989-990
Transplantation 96-98 260-276
Immunisation 18-19 218-219

PHO Course

Preparation for House Officer Training
Seminar: Use of laboratory services

Immunology will present a session during a 60-90 minute seminar covering all the CLS disciplines. Objectives for this part of the course will be covered in a separate handout issued during the session.
MICROBIOLOGY AND INFECTIOUS DISEASE

OUTLINE
By the time you start the clinical course you will have learned a considerable amount about microbiology and infectious diseases. This will have been achieved mainly through the Semester 3 course of lectures and practicals in Microbiology (MB) and subsequently during the Antimicrobial Chemotherapy course during Semester 5, year 3. In addition, you will have begun to see patients with infection during your general practitioner and other attachments.

The presentation and management of patients with infection will continue during the remainder of your undergraduate course and beyond in a variety of different contexts (e.g., pneumonia during medical attachments, meningitis during child health attachments, rubella during obstetrics etc). Finally, a significant degree of experience about infective conditions will be acquired at the bedside.

The relatively few teaching/learning sessions for microbiology and infectious diseases allocated during the later years of your course will concentrate on specific areas of importance, highlighting key issues. These will be less didactic that earlier teaching in microbiology and a basic level of knowledge will be assumed of the student. It is therefore advisable that you revise what you have already learned earlier by re-reading lecture notes and relevant chapters in the microbiology textbooks recommended during the earlier years as it will not be possible to cover this ground again. Furthermore, you will gain more from the sessions outlined below if revision is done. The few students who have already spent time in microbiology carrying out a B Med Sci project and students who have a clinical attachment at some stage in infectious diseases will have an advantage over their peers but it is our intention to ensure that all students have a basic level of knowledge on which they will be assessed.

TEACHING IN SEMESTER 6

Lecture: Control of Infection
This 45-60 minute lecture will cover important aspects of the control of infection in hospital including, handwashing, patient isolation, needlestick injuries and other occupational health issues relating to infection. It will emphasise the professional responsibility of all healthcare workers to minimise the spread of infection to patients and other members of staff.

Objectives: at the end of this session, student will be able to

- Outline the importance of handwashing, describe how to do it effectively, and list the reasons why compliance is often poor
- Describe which patients require isolation and why
- Describe how to minimise needlestick injuries and what to do in the event of sustaining one themselves
- Describe the relatively high risk of transmitting group A streptococcal and enteric infection to patients and list reasons why healthcare workers should not continue to work if symptomatic
Case Presentation: HIV diagnosis
This session will focus on some important issues surrounding HIV diagnosis and its implications.
Objectives: At the end of this session the student will,
- understand the routes of transmission of HIV and other bloodborne viruses
- appreciate the methods available in general to diagnose viral infections
- know how a specimen from an inoculation risk patient should be safely sent to the laboratory
- understand the shortcomings of antibody testing in confirming HIV infection

Recommended Reading
Problem-Orientated Clinical Microbiology and Infection (Humphreys & Irving), Case 30 and Appendix 4

Infection (Finch & Ball), Chapter 33

Case Presentation: Septic shock
This session will follow the clinical course of an elderly lady admitted via A+E presenting with septic shock.
Objectives: At the end of this session the student will be able to:
- list the important microbiological and other investigations urgently indicated
- describe the common sources of, and bacteria responsible for, bacteraemia
- outline the initial management of the acutely septic patient, including initial blind antibacterial therapy

Recommended Reading
Prob.-Orient. Clin. Microbiology & Infection (Humphreys & Irving), Case 44 & Appendix 3 Infection (Finch & Ball), Chapter 29

Case Presentation: Infections presenting in the community
Three brief clinical scenarios will be presented to highlight the investigations (if any required) and treatment of common infections presenting to general practitioners.
Objectives: At the end of this session the student will be able to:
- List a differential diagnosis of a young man or women with a sore throat and describe which investigations are indicated and when
- List the causes, relevant investigations and management of patients with frequency and dysuria
- List the implications of infective skin lesions in an infant attending a day nursery

Recommended reading
Prob.-Orient. Clin. Microbiology & Infection (Humphreys & Irving), Cases 9, 26 & 36
Medical Microbiology (Greenwood, Slack & Peutherer), Chapter 63
Infection (Finch & Ball), Chapters 3, 12, 13 & 21
Cases of Infection
Common and important clinical conditions, often of current interest in the diagnostic department, are presented in a problem-orientated and relatively informal style, and the active participation of students through a series of questions and discussion is a key feature. It is presented by clinical members of the Division of Microbiology and Infectious Diseases and the Public Health Laboratory, Nottingham. These sessions take place at University Hospital, QMC (Thursday, 13.15 - 14.00 hrs. Microbiology Seminar Room, A Floor West Block) and at the City Hospital (see local noticeboards for venue) but it is currently not possible to run similar sessions at Derby and Mansfield. As students rotate from hospital to hospital, an individual student may not attend a full series of cases, so he or she should supplement this with additional reading as indicated.

In general, cases presented during the autumn, winter and early spring are geared to the more advanced student (ie final year or equivalent) whereas those in late spring and early summer directed to the more junior student (ie introductory medicine and surgery). Sessions take place on most Thursdays during the year with short breaks for Christmas, Easter/changeover and a four week break during August. Every effort is made to inform students in advance when sessions have to be cancelled. In turn student representatives should inform a member of staff when few if any students are likely to be present due to exams or changes in firm. Students are encouraged to relate the cases presented to those seen on the wards, in the outpatients clinic or in their general practitioner attachments. Presenters will usually be happy to discuss, if time allows, points of interest relating to infections seen by students in their clinical attachments.

General objectives: Following attendance at these sessions the student will:

- have a basic understanding of the clinical presentation and diagnosis of common infections, including the following:
  - meningitis, brain abscess
  - community-and hospital-acquired pneumonia, lung abscess, influenza
  - gastroenteritis and food poisoning, traveller’s diarrhoea, intra-abdominal sepsis, enteric fever
  - urinary tract infection, pyelonephritis septic arthritis and osteomyelitis
  - bacteraemia/endocarditis, intravascular line infections
  - pulmonary and extra-pulmonary tuberculosis
  - viral hepatitis
  - human immunodeficiency virus-associated conditions
  - viral infections in pregnancy
  - malaria
- understand the basic principles of the prevention of infection in the hospital (eg isolation, cohort nursing) and in the community (eg notifiable diseases).
- know which investigations are indicated when, and how the diagnostic microbiology laboratory can assist in the diagnosis of infection by culture and other techniques.
- appreciate particular features of specific pathogens which contribute to their pathogenicity and their propensity to spread.
- become familiar with the most commonly used antimicrobial agents and which regimens are most appropriate when treating infection
**Recommended Reading**
Problem-Orientated Clinical Microbiology and Infection (Humphreys & Irving); where possible presenters will identify relevant cases in the book for further reading.

Medical Microbiology (Greenwood, Slack & Peutherer); relevant sections dealing with the specific pathogens discussed in the cases.

Infection (Finch & Ball); background material on infections discussed.

Notes on Medical Virology (Timbury); specific for background material on relevant viruses and approaches to diagnosis.

Antimicrobial Chemotherapy (Greenwood); chemotherapeutic aspects and background material on antibiotics.

Relevant sections in medical, surgical and other textbooks

### ENT

**Teaching in Otorhinolaryngology - ENT Infections**
This session takes place during your ENT attachment. It is jointly taught by Microbiology and Infectious Diseases, and Otorhinolaryngology, with particular emphasis on common infections presenting to the general practitioner.

Objectives: At the end of this session the student will be able to

- describe the aetiology and management of the ‘common cold’ and sinusitis
- List when and which investigations are indicated for ‘sore throat’
- Describe the presentation and management of otitis media and otitis externa
- Describe the clinical presentation and importance of whooping cough, mumps and diphtheria

**Recommended reading**
Problem Oriented Clinical Microbiology and Infection (Humphreys & Irving), Cases 7, 8, 9, 10.

Infection (Finch & Ball), Chapter 13.

Relevant sections in your ENT textbooks

### YEAR 5

**TEACHING IN YEAR 5**

**Case presentation: MRSA**
The investigation and management of a patient acquiring methicillin-resistant Staphylococcus aureus (MRSA) in hospital is discussed, highlighting key aspects common to preventing other resistant pathogens.

Objectives: At the end of this session the student will be able to

- describe the nature of MRSA and list the risk factors for acquisition
- List measures necessary to prevent spread
- Outline common topical and systemic antimicrobial agents which can be used to eradicate or treat systemic infection.

**Recommended reading**
Handout on factors contributing to increasing antibiotic resistance, and other problem and emerging resistant bacteria.
Case presentation: serology to diagnose viral infections
A series of brief clinical scenarios together with the results from serological investigations will be discussed.
Objectives: At the end of this session the student will be able to
• interpret rubella antibody results during pregnancy
• list the different markers for hepatitis B and describe what they indicate
• list important serological investigations required before organ transplantation
• describe the sequence of investigations in a patient with infectious mononucleosis.

Recommended reading
Problem-Orientated Clinical Microbiology (Humphreys & Irving), Cases 9, 22, 53 & 55.

Cases of Infection
Common and important clinical conditions, often of current interest in the diagnostic department, are presented in a problem-orientated and relatively informal style, and the active participation of students through a series of questions and discussion is a key feature. Details as listed above for teaching in semester 6.

Assessment
A formative viva is held approximately 3 weeks before the OSCE examinations. Microbiology is assessed at the end of the senior medicine/surgery attachment as part of the CLS MCQ paper. Results may be presented for data interpretation in the OSCE examination.

Pre-House Officer Training
Seminar: Use of laboratory services
Microbiology will present a session during a 60-90 minute seminar covering all the CLS disciplines. Objectives for this part of the course will be covered in a separate handout issued during the session.

Seminar: Infection in hospital
A session on infection control and precautions to be taken as part of the medical team. Objectives for this part of the course will be covered in a separate handout issued during the session.
OUTLINE OF TEACHING

Students entering the clinical part of the course have had a strong grounding in general pathology, provided by a teaching course in semesters 3 and 4 (Pathology lecture course). It is essential that the knowledge and skills obtained in semesters 3 and 4 are integrated into the teaching which will be delivered in the clinical part of the course. This knowledge will be assumed and may be examined in the later parts of the course.

The teaching programme aims to provide the necessary expertise and experience required to practice as a pre-registration house officer. However, it should be seen as part of the overall training required to become a post-registration medical practitioner and as the start of continuing medical education which will be required to maintain high standards during the whole of a professional career.

Teaching in pathology involves the gradual acquisition of factual information, practical skills and attitudes such that the student will become familiar with the aetiology, pathobiology and clinical course of diseases. In addition the student has to be familiar with the very wide range of clinical diseases in which Histopathology is used to establish a diagnosis and determine clinical management. In semester 6 (Introductory medicine and surgery) the pathology of common diseases will be covered. In Year 4 Histopathology teaching will be related to special subjects of child health, obstetrics & gynecology, health care of the elderly, psychiatry, dermatology, and otorhinolaryngology. In year 5 the Histopathology of osteoarticular disease will be covered together with increasing the breadth of knowledge of the pathology of organ systems.

Clinicopathological co-operation in patient management is very important and the student should participate in clinicopathological conferences which are held as part of their firmbased teaching, especially in areas where multidisciplinary consultation is usual in reaching a diagnosis and deciding on management. Such experience is vital in developing communication skills.

Students have to gain experience in medico-legal aspects of clinical practice and in semester 6 a limited exposure to this is encouraged. Towards the end of Year 5 students will become fully conversant with the medico-legal aspects of death certification and the histopathologist’s and Coroner’s role in the investigation of sudden and unnatural death, exclusive of criminal cases.

TERMS USED IN OBJECTIVES

The instructional objectives, we list later, attempt to convey a clear picture of what is required of the student. The lists may look long, but in many instances all that is required is to read and understand a single paragraph from a book. Because some terms like “know” and “understand” are open to several interpretations, an attempt has been made to indicate several levels of knowledge, skill and aptitude in the document as follows:
Outline...this will mean having a general awareness of the subject. This will ensure students have a broad awareness of a particular processes. For example, ‘Outline the diseases of the renal glomerulus’ would mean that a student would be expected to be able to discuss the classification and general principals of pathogenesis of glomerular disease but would not be expected to know about individual patterns of glomerulonephritis or diagnose a case in a practical examination.

Identify...recognise.. these terms are used to indicate a high level of skill whereby a student will recognise the macroscopic and/or histological features of a condition(s) and arrive at a diagnosis if possible. This skill will assume an accompanying knowledge of classification and differential diagnosis at a level to be found in the recommended textbook.

Describe....List.. these terms are used to indicate a high level of knowledge whereby a student will be able to relate detailed knowledge of a condition(s) at a level to be found in the recommended textbook.

Demonstrate...this term is used to indicate a high level of skill whereby a student will be able to show a high level of competence in dealing with a tissue/technique/or process at a level to be found in the recommended textbook. Examiners will be looking for evidence of familiarity with the task, accompanied by a high level of insight into the task being demonstrated.

TEACHING IN SEMESTER 6

• Directed reading and small group tutorials: each student will be allocated to a pathology tutor (a list is provided by the teaching coordinator at each site) for a weekly tutorial lasting around one hour. Students will be generally taught in groups of 8-10 based on clinical attachments. The time of tutorials should be planned in the context of the working schedules which exist on different ward attachments. All students should contact their named pathology tutor as soon as they start a new ward attachment. In preparation for tutorial each student will undertake directed reading. Tutorials are not meant to be didactic teaching sessions but are meant to address problems which have been encountered in the course of directed reading. The recommended course textbook is PATHOLOGY by A.Stevens & J. Lowe Times-Mirror Mosby 1995.

• Firm-based clinico-pathological meetings: these sessions should be attended in the context of the working schedules which exist on different ward attachments. Not all clinical attachments will feature such an activity.

• Computer-aided learning: this can be used to supplement directed reading. A CD-ROM of one of the recommended textbooks is available at the QMC site. This has animations and case studies to supplement text found in the recommended textbook.

• Attending Autopsies: the student should attend at least one autopsy during semester 6

• Assessment
MCQ questions at end of introductory medicine and surgery
General objectives
To become familiar with natural history, macroscopic and histological features of common medical and surgical conditions; to become broadly familiar with the techniques involved in carrying out a full autopsy and arriving at a clinico-pathological correlation. NOTE: A knowledge of the basic cell biology and the pathophysiology of general pathological processes of ischaemia, thrombosis, embolism, infarction, healing/repair, and neoplasia has been taught in semesters 3 and this knowledge will be assumed and may be examined on in this part of the course.

Autopsy
Each student should attend the post mortem room to see an autopsy. Students should read the document produced by the Royal College of Pathologists on the value of the autopsy prior to attending the mortuary (medical library). These activities are noted in the log book and will be signed by the attending pathologist. Note: any medical student is welcome to attend autopsy sessions at any time providing this is arranged with mortuary staff and the attending pathologist. Normally this can be done at short notice by a telephone call to the mortuary of fice. Post mortem examinations generally take place between 9.00 am and 1.30 pm each day.

Objectives: After attending an autopsy the student should be able to
• Describe the process of evisceration, dissection and reconstitution.
• Give the cause of death for the case studied.
• Present a verbal clinico-pathological correlation to the pathologist attending the case.
• List the differences between an autopsy performed on behalf of HM Coroner and an autopsy performed after asking the consent of next of kin.

Pathology Tutorials
Organisation and format of teaching
• Each student will be allocated a named pathology tutor by the teaching administrator at each hospital site.
• Students should arrange to meet briefly with their tutor to plan the order of the tutorials in the introductory week. As far as possible the pathology topics should be done at the same time as the clinical topic teaching in the same area (This will vary between different hospital sites).
• Prior to each tutorial students are expected to have done the directed reading. The pages listed in the topics below refer to the recommended textbook, Pathology by Stevens & Lowe, Mosby 1995. Students should note any problems they have in understanding. At the tutorial the tutor will teach around problems raised by students, the tutorials are not meant to be didactic teaching sessions.

Tutorial topics and directed reading:
Atherosclerotic vascular disease and aneurysms pages in S&L 129-134
Ischaemic heart disease Pages in S&L 144-149
Hypertension Pages in S&L 134-137
Venous thrombosis and pulmonary thromboembolism Pages in S&L 123-127
Inflammatory bowel disease Pages in S&L 228-230
Peptic ulceration and gastritis Pages In S&L 221-223
Carcinoma of stomach, oesophagus, colon and rectum Pages in S&L 223-225, 220, 231-234
Objectives: After attending the course of Histopathology tutorials the student should be able to

- Describe the morphology and pathological complications of myocardial infarction
- Describe the pathological consequences of atheroma of large vessels
- Describe the morphological and histological changes seen in cardiac failure.
- Describe the causes and pathological consequences of systemic hypertension.
- Describe the causes and pathological consequences of venous and arterial thrombosis.
- List the aetiology and describe the morphology of different types of aneurysm
- Describe the morphology and pathological consequences of chronic bronchitis.
- Outline a classification of emphysema and describe its aetiology.
- Describe the morphology and pathological consequences of emphysema.
- Describe the morphology and pathological consequences of asthma.
- Describe the aetiology, morphology and pathological consequences of pleural effusion.
- Describe the classification, aetiology, morphology and pathological consequences of gastritis
- Describe the aetiology, morphology and pathological consequences of peptic ulceration
- Describe the morphology and pathological consequences of ulcerative colitis and Crohn’s disease
- Outline the main causes and consequences of hepatic failure
- Describe the aetiology, morphology and pathological consequences of acute and chronic hepatitis
- Describe the morphology and pathological consequences of cirrhosis
- Describe the aetiology, morphology and pathological consequences of cholelithiasis.
- Describe the aetiology, morphology and pathological consequences of nodular goitre
- Outline the aetiology and pathological consequences of renal failure.
• Describe the morphology and pathological consequences of hypertensive damage to the kidney
• Describe the morphology and pathological consequences of diabetes mellitus on the kidney
• Describe the aetiology, morphology and pathological consequences of renal, ureteric and vesical calculi.
• Describe the aetiology, morphology and pathological consequences of fibrocystic disease of breast
• Describe the aetiology, morphology and pathological consequences of haemorrhagic and ischamic stroke
• Describe the aetiology, morphology and pathological consequences of common tumours of lung, oesophagus, stomach, colon, breast, kidneys, bladder, and thyroid.
• Recognise macroscopic abnormalities in organs and begin to be able to formulate a differential diagnosis. By the end of semester 6 the student should be able to recognise normal and abnormal tissues for the majority of the common diseases, and be able to describe the changes using appropriate pathological terminology.

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**Ortho/Rheum**

**TEACHING IN TRAUMA/ORTHOPAEDICS/RHEUMATOLOGY**

Teaching in pathology is by directed reading from the recommended textbook

**General objectives**

to increase the breadth of knowledge of natural history, macroscopic and histological features of medical and surgical conditions. To consolidate knowledge of pathology gained in previous teaching in earlier parts of the medical course.

**Detailed objectives**

At the end of this program of directed reading students should be able to

• Describe the classification and pathology of injury caused by mechanical trauma and extremes of temperature (S&L p 112-115).
• Describe the aetiology, morphology and pathological consequences of osteoporosis, osteomalacia, hyperparathyroidism, renal osteodystrophy, Paget’s disease of bone (S&L p 476-480).
• Describe the morphology and pathological consequences of bone fracture (S&L p 480-483).
• Describe the morphology and pathological consequences of bone infection (S&L p 483).
• Describe the aetiology, morphology and pathological consequences of osteoarthritis, crystal arthropathies, rheumatoid disease, infective arthritis, reactive arthritis and ankylosing spondylitis (S&L p 488-493).
• Describe the morphology and pathological consequences of trauma to bone, joints, tendons and ligaments (S&L p 493-494).
• Outline the classification, morphology and pathological consequences of primary tumours of bone and soft tissue (S&L p 483-486; 495).
• Describe the classification aetiology, morphology and pathological consequences of trauma to the nervous system including raised intracranial pressure (S&L p 405-407 398-399)
• Outline the classification, aetiology, morphology and pathological consequences of muscular dystrophies and myopathies (S&L p 432-437)
• Describe the aetiology, morphology and pathological consequences of
Describe the aetiology, morphology and pathological consequences of progressive systemic sclerosis (S&L p 499-500)
Describe the aetiology, morphology and pathological consequences of rheumatoid disease (S&L p 500-502).

TEACHING IN SENIOR MEDICINE SURGERY

• Directed reading and small group tutorials: each student will be allocated to a pathology tutor (a list is provided by the teaching coordinator at each site) for a weekly tutorial lasting around one hour. Students will be generally taught in groups of 8-10 based on clinical attachments. The time of tutorials should be planned in the context of the working schedules which exist on different ward attachments. All students should contact their named pathology tutor as soon as they start a new ward attachment. In preparation for tutorial each student will undertake directed reading. Tutorials are not meant to be didactic teaching sessions but are meant to address problems which have been encountered in the course of directed reading. The recommended course textbook is PATHOLOGY by A.Stevens & J. Lowe Times-MirrorMosby 1995.

• Firm-based clinico-pathological meetings: these sessions should be attended in the context of the working schedules which exist on different ward attachments. Not all clinical attachments will feature such an activity.

Assessment

A formative viva is held approximately 3 weeks before the OSCE examinations. Pathology is assessed at the end of the senior medicine/surgery attachment as part of the CLS MCQ paper. Results may be presented for data interpretation in the OSCE examination.

Pathology tutorials

Organisation and format of teaching

• Each student will be allocated a named pathology tutor by the teaching administrator at each hospital site.
• Students should arrange to meet briefly with their tutor in the introductory week. THE SCHEDULE AND ORDER OF TUTORIALS IS IMPORTANT SO THAT WHEN STUDENTS SWAP SITES THEY DO NOT RECEIVE DUPLICATE TEACHING.
• Prior to each tutorial students are expected to have done the directed reading. The pages listed in the topics below refer to the recommended textbook, Pathology by Stevens & Lowe, Mosby 1995. Students should note any problems they have in understanding. At the tutorial the tutor will teach around problems raised by students, the tutorials are not meant to be didactic teaching sessions.

Tutorial topics and directed reading:

First attachment (9 weeks)

• Revision of cardiovascular pathology: students should review tutorial topics in cardiovascular pathology from introductory medicine and surgery as detailed earlier in this document.

• Vasculitis, myocarditis, cardiomyopathy, pulmonary hypertension (S&L pages 137-140, 149-150, 137)
• Disease of heart valves (S&L pages 151-154)

• Revision of respiratory pathology: students should review tutorial topics in Respiratory pathology from introductory medicine and surgery as detailed earlier in this document.

• Diffuse alveolar damage, pulmonary fibrosis, pneumoconiosis (S&L: pages 173-179)

• Revision of GI pathology: students should review tutorial topics in GI pathology from introductory medicine and surgery as detailed earlier in this document.

• Vascular disease of the bowel and disorders of gut motility. Diseases associated with malabsorption (S&L pages 226-228, 236-237, 235-236)

• Complications of cirrhosis. Vascular disorders of the liver, metabolic liver disorders, tumours of the liver (S&L pages 248-249, 257-258, 259-261, 263-264)

Second attachment (9weeks)
• Pancreatitis and carcinoma of the pancreas (S&L pages 268-271)

• Lymphadenopathy (S&L 272-284)

• Pathology of parathyroid, adrenal and pituitary glands (S&L pages 306-312, 298-300)

• Renal disease (S&L pages 323-325, 334-335, 336-339, 348-349)

• Disease of male genital system (S&L pages 350-360)

• Nervous system: multiple sclerosis, peripheral nerve disease. Tumours of peripheral nerves.(S&L pages 413-414, 428-431)

• Nervous system: Encephalitis, cerebritis, prion disease. Brain tumours. (S&L pages 409-413, 423-428)

**General objectives:** to increase the breadth of knowledge of natural history, macroscopic and histological features of medical and surgical conditions. To consolidate knowledge of pathology gained in previous teaching in earlier parts of the medical course.

**Detailed objectives**
At the end of the series of tutorials students should be able to
• Describe the classification, aetiology, morphology and pathological consequences of vasculitis
• Describe the aetiology, morphology and pathological consequences of pulmonary hypertension
• Describe the classification, aetiology, and pathological consequences of cardiomyopathy.
• Describe the aetiology, morphology and pathological consequences of
myocarditis.

• Describe the classification, aetiology, morphology and pathological consequences of cardiac valvular disorders.
• Describe the classification aetiology, morphology and pathological consequences of diffuse alveolar damage and interstitial lung diseases.
• Describe the classification aetiology, morphology and pathological consequences of pneumoconioses
• Describe the aetiology, morphology and pathological consequences of malabsorption
• Describe the classification aetiology, morphology and pathological consequences of vascular disease of the bowel
• Describe the classification aetiology, morphology and pathological consequences of disorders of gut motility
• Describe the classification aetiology, morphology and pathological consequences of vascular disease of the liver
• Describe the pathological consequences of cirrhosis
• Describe the classification aetiology, morphology and pathological consequences of tumours of the liver
• Describe the classification aetiology, morphology and pathological consequences of pancreatitis
• Describe the classification aetiology, morphology and pathological consequences of pancreatic carcinomas
• Outline the classification aetiology, morphology and pathological consequences of lymphomas
• Outline the aetiology of non-neoplastic lymphadenopathy
• Describe the classification pathological consequences of pituitary tumours
• Describe the classification aetiology, morphology and pathological consequences of parathyroid disorders
• Describe the classification aetiology, morphology and pathological consequences of adrenal atrophy, hyperplasia and tumours.
• Outline the pathological mechanisms operating in glomerulonephritis.
• Describe the classification aetiology, morphology and pathological consequences of pyelonephritis
• Describe the classification aetiology, morphology and pathological consequences of interstitial diseases of kidney
• Outline the classification aetiology, morphology and pathological consequences of cystic diseases of the kidney
• Describe the aetiology, morphology and pathological consequences of inflammatory disorders of the testis and para-testicular tissues.
• Outline the classification aetiology, morphology and pathological consequences of diseases of the penis and scrotum
• Outline the classification aetiology, morphology and pathological consequences of diseases of the tumours of the testis
• Describe the classification aetiology, morphology and pathological consequences of carcinoma of the prostate.
• Describe the classification aetiology, morphology and pathological consequences of prostatic hyperplasia.
• Describe the classification aetiology, morphology and pathological consequences of encephalitis and cerebritis.
• Describe the morphology and pathological consequences of multiple sclerosis.
• Outline the classification, morphology and pathological consequences of
primary and secondary tumours of the CNS and meninges.
  • Outline the classification aetiology, morphology and pathological consequences of peripheral neuropathy.
  • Describe the classification, morphology and pathological consequences of tumours of peripheral nerve.
  • recognise macroscopic abnormalities in organs and begin to be able to formulate a differential diagnosis. By the end of year 5 the student should be able to recognise normal and abnormal tissues for the majority of the common diseases and be able to describe the changes, and give a differential diagnosis.

**Preparation for House Officer Training**

**Seminar: Use of laboratory services**

Pathology will present a session during a 60-90 minute seminar covering all the CLS disciplines. Objectives for this part of the course will be covered in a separate handout issued during the session.

**Seminar: Medicine and the law**

There will be a seminar on the law and the doctor. Objectives for this part of the course will be covered in a separate handout issued during the session.