HAEMATOLOGY

Scheme of rotation for Residents training in Haematology speciality (R1 to R5).

During the rotation in R1-R5 the resident is expected to acquire knowledge and practical experience of the items in the attached check list which is adopted by the Royal College of Pathologist (Australasia).

The residents will have to cover routine general Haematology work beside the specialized training all through, except when they are doing blood transfusion,

1. The 1st year of the programme (R1).

1. The residents will be rotating mainly in Haematology, beside spending specified times of rotation in the other relevant disciplines of Pathology as following:

    a. Histopathology 4 Weeks
    b. Medical Biochemistry 3 Weeks
    c. Medical Microbiology 3 Weeks
    d. Immunology 5 Weeks
    e. Cytogenetics 4 Weeks

2. The residency is excepted to indulge himself/herself, under supervision, in the general haematology training with no emphasis on a specific subspeciality in haematology.

3. The resident would attend all various relevant haematological activities both clinical and laboratory e.g. grand rounds, clinical presentations, CPCs, cyto-haematology sessions, etc.

4. The resident will have to attend the theoretical lectures which were used to be given in the previous R1 schedule on Tuesdays.

5. During and at the end of this year the resident will sit for a two parts examination, which will carry 70% of the total marks, on the theoretical lectures (35% for each) and 30% on the rotation assessment, as per regulations.

II. The 2nd year of the programme (R2)

1. The training will continue in general haematology as in the 1st year (R1)

2. The resident is excepted to gain knowledge and practical experience in isotope, electron microscopy and immunohisto and cytochemistry in relation to haematology for a period of one and half month, one month and half a month respectively beside the routine haematological work coverage. The place for this training will be decided by the joint committee.

3. HLA typing and flow cytometry are expected to be covered for a 3 months during R2 beside the routine

4. The resident at the end of R2 will have to sit for a written examination as per regulations.

III. The 3rd year of the programme (R3)

During this year the resident should have a rotation scheduled as following:

1. The candidate is expected to spend 3 months in a hospital based blood transfusion service together with some experience in blood component pharesis.

2. Beside being involved in the routine haematology work, the resident is excepted to give strong emphasis and acquire comprehensive knowledge and practical experience in coagulation for a period of six months.

3. The resident will spend 3 months period in clinical haematology together with the Related relevant laboratory work.

4. The resident by the end of R3 is expected to sit for a comprehensive examination as per regulations.

1V. The 4th year of the programme (R4).

1. During this year and for 3 months the resident is expected to acquire knowledge and practical experience in all aspects of lymphoma work up, beside the routine haematology work coverage.

2. Six month mainly devoted to clinical haematology together with the related relevant laboratory work coverage.

3. It is very strong recommended that for a resident to become a haematologist, he/she will have to spend at least 3 months in a national blood transfusion center abroad until the time comes and a center is established in the kingdom.

4. The resident is expected to start and complete a research project during this year.

5. The resident at the end R4 will have to sir for a written examination as per regulations.

V. The 5th year of the programme (R5).

1. The year is expected to the a period for training in elective subspecialities and conducting research work as well as compensating for any training gaps the resident may need in the field of haematology.

2. The resident is also expected to continue doing routine haematology work coverage.

3. The examination will be a graduating comprehensive one at the end of this year (R5) according to the KSU examination regulations.

4. The examination will be a graduating comprehensive one at the end of this year (R5) as per regulations.

VI. Evaluation

1. Examination and evaluation of residents as the end of each year will abide with the KSU examination regulations and any modification thereafter.

2. The resident after each rotation has to be evaluated and provided with a signed logbook to show the extent of the practical experience already covered, before going to the next rotation.

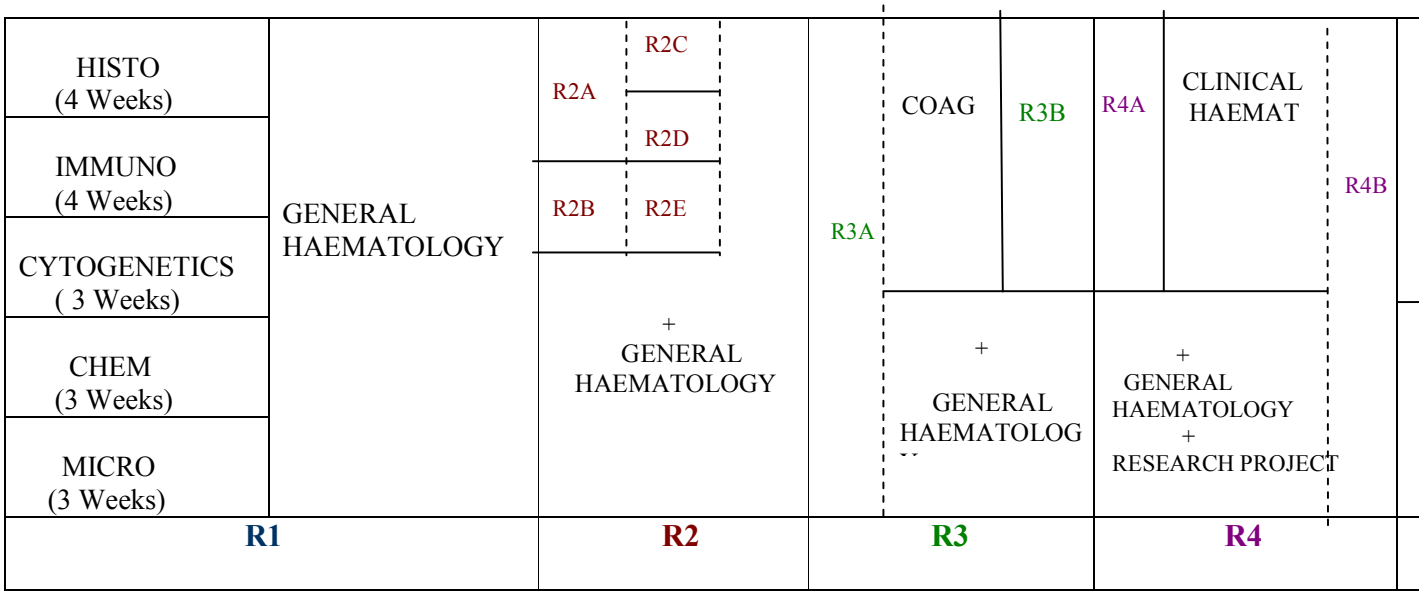
3. The supervisors are supposed to send to the coordinator, a full detailed report as well as the filled official evaluation report on the residents performance at the end of each rotation.

VII. Place of Training

1. The place of the above mentioned training periods will be decided by the Joint Training Committee and will always take the trainees' best interest into consideration, so that they can get the best training available.

2. The rotation periods for the resident's training will be on a 12 months basis in each of the participating Hospitals, subjected to modification at any time according to the decision of the Joint Training Committee and the availability of a specialized service in any of the participating hospitals.

KING SAUD UNIVERSITY FELLOWSHIP
IN PATHOLOGY
ROTATION SCHEME (DIAGRAM)
FOR
RESIDENCY TRAINING
IN HAEMATOLOGY



Graduation

R2 : A = Flowcytomelry
C = Immunohistochemistry
E = Isotopes
B = HLA Typing
D = Electron Microscopy

R3 : A = Hospital Blood Transfusion Service
B = Clinical Haematology

R4 : A = Lymphoma workup
B = National Blood Transfusion (Abroad)

HAEMATOLOGY CHECKLIST

(Note that this is not a syllabus)
(Adopted from the Royal College of Pathologists -Australasia)

A) General Trainees

General trainees are expected to acquire knowledge and experience in the following aspects of the laboratory practice of haematology:

(i) LABORATORY ASMINISTRATION

The organization and management of a routine haematology laboratory with emphasis on:

- handling of specimens (including collection, indentification, preservation and disposal)
- work flow procedures
- recording and reporting systems
- handling of urgent and out -of- hours work
- laboratory safety (biologic and other)
- assessment of appropriate technology
- inventory control

(ii) BASIC LABORATORY PROCEDURES

- preparation of solutions
- performance of sterile procedures
- calibration and use of diluters and pipettes
- principles and usage of SI unit

(iii) LABORATORY INSTRUMENTATION

*** Light microscopy**

Knows principle of light microscopy. Is able to adjust instrument for most effective use and perform minor maintenance, e.g. replace lamp and clean lenses. Keeps microscope clean and in good working order during routine work.

*** Phase-contrast microscopy.**

Knows principle of phase-contrast microscopy. Is able to set-up and adjust phase- contrast microscope.

* **Photo-electric colorimeter**

Knows principles of colorimetry. Is able to calibrate instrument with dilutions of a standard solution of cyanmethaemoglobin and operate and maintain it satisfactorily.

* **Automated cell counter**

Knows principles of various types of automated cell counters. Is able to calibrate, operate and maintain instruments. Understands principles and application of instrument quality control.

* **Automatic staining machine**

Is able to operate and maintain instrument to obtain satisfactory staining of blood and marrow films.

* **Electrophoresis**

Knows principal of electrophoresis. Is a able to interpret cellulose acetate electrophoresis of haemoglobin solution.

* **pH meter**

Knows principles of pH measurement . Is able to operate instrument to determine pH of unknown solution.

* **Weighing**

Is able to weigh samples using the appropriate balances.

* **Centrifuge**

Knows principles of centrifugation. Is able to calculate centrifugal fields and maintain and operate instrument satisfactorily.

(iv) HAEMATOLOGY TESTS

It is essential for trainees to understand the theoretical basis of the following common Haematology tests and to gain practical " hands-on" experience in their performance and interpretation.

Basic tests and procedures.

* Preparation of satisfactory blood films
* Performance of bone marrow aspiration and trephine biopsy
* Performance of satisfactory bone marrow aspirate films
* Staining of blood and bone marrow aspirate films with Romanowsky stains
* Interpretation of blood and bone marrow aspirate films and bone marrow trephine histological sections of common haematological disorders, including recognition of malarial parasites.

Performance of:

- haemoglobin estimation (P.E. colorimeter)
- P.C.V., using microhaematrocrit centrifuge
- calculation of red cell "absolute values"
- manual leucocyte count
- differential count on blood and bone marrow aspirate films
- E.S.R
- sickling test
- N.A.P. score
- Infectious mononucleosis screening test
- LE cell test

Haemolysis tests

Performance of:

- reticulocyts count
- direct antiglobulin test
- Schumm's test
- Heinz body preparation
- heat instability test
- screening test for G-6-PD deficiency
- test for urinary haemosiderin
- planning of the investigation of a patient with haemolytic anaemia
- Recognition of electrophoretic mobility of common abnormal haemoglobins

Haemostasis tests

Performance of:

- whole- blood coagulation time
- prothrombin time
- Thrombotest
- activated partial thromboplastin time
- thrombin time
- fibrin degradation product measurement
- bleeding time

Blood transfusion tests

Performance of:

- Blood grouping
- crossmatching procedures:
  - saline
  - enzyme
  - coombs

* Planning of the investigation of a suspected transfusion reaction

Miscellaneous tests

The principles of the following tests should be known:

* Serum iron, total iron binding capacity and ferritin measurements
* Serum vitamin B 12 assay
* Serum and red cell folate assays
* Schilling tests
  - Acid-serum (Ham and sucrose lysis tests
  - Cold agglutinin titre
  - Osmotic fagility
* Autohaemolysis
* Hb F and Hb A2 measurements
* Acid-elution test
* Plasma fibrinogen measurement
* Platelet aggregation and adhesion studies
* Red cell antibody detection and identification using donor cell panels
* Radioisotope studies - red cell mass
  - red cell survival
* Detective of serum and urinary paraproteins using serum EPG, immunoelectrophoresis and immunofixation
* Tests for Hepatitis B surface antigen/antibody

(v) QUALITY ASSURANCE

- internal quality control
- external quality assessment
- basic statistics as applied to quality control

(B) SPECIAL TRAINEES

Special trainees are expected to acquire comprehensive knowledge and practical experience in the areas detailed in the General Trainees check list. In addition, the following should be covered:

(i) LABORATORY ADMINISTRATION

laboratory computer systems reference values and their application

(ii) LABORATORY INSTRUMENTATION

Spectrophotometer

Knows principles of spectrophotometer. Is able to operate and maintain Instrument satisfactory

Spectroscopy

Knows principles of spectroscopy. Is able to use a hand spectroscope and Recognize the absorption bands of oxyhaemoglobin, reduced hadmoglobin, methaemoglobin and haemochrimogen.

(iii) HAEMATOLOGY TESTS

It is essential for trainees to understand the theoretical basis of the following Common haematology tests and to gain practical "hands –on" experience in their performance and interpretation.

BASIC TESTS AND PROCEDURES

- Staining of blood and bone marrow aspirate films with Romanowsky stains, manually and with staining machine
- Staining of blood films with myeloperoxidase, Sudan Black, PAS, esterase and acid phosphatase stains,
- Preparation of supravital –stained blood films using cresyl blue, new methylene blue and methyl violet
- Preparation of thick blood films for demonstration of malarial parasites
- Interpretation of blood and bone marrow aspirate films and bone marrow trephine histological sections.

* **Performance of**

- direct antiglobulin test using “broad spectrum” and monospecific reagents
- Infectious mononucleosis screeing test and the classical Paul-Bunnell test
- Schilling test
- radioisotope studies - red cell mass
  - red cell survival
  - measurement of faecal blood loss
- serum viscosity menasurement

Haemolysis tests

* **Performance of**
- osmotic fragility
- authohaemolysis
- acid-serum (Ham) test
- sucrose lysis test
- cold agglutinin titre, thermal amplitude, 1-I specificity
- tests for Hb-S
- Hb-F measurement
- Hb-A2 measurement
- cellulose acetate electrophoresis of haemoglobin solutions
- acid – elution test
- isopropanol precipitation test
- screening tests for G-6-PD and PK deficiency
- Donath-Landsteiner test

Haemostasis test

* **Performance of :**

- bleeding time Ivy or template method
- plasma fibrinogen measurement
- prothombin consumption test
- fibrin monomer screening test
- euglobulin lysis time
- clot solubility in 5M urea
- Factor VIII procoagulant assay
- Factor VIII antigen measurement
- platelet aggregation and adhesion studies
- coagulation inhibitor tests

Blood Transfusion Tests

*** Performance of :**

- anti –A and anti –B haemagglutinin titres
- Rh genotyping
- antenatal serology
- antibody detection and identification using donor cell panels

Miscellaneous tests

Trainees should knows the principles of the following tests and procedures and have observed their performance:

- Gamma counting using scintillation detector
- Organ localization tests using in-vivo scintillation probes
- Basic chromosomal analysis
- Serum iron, total iron-binding capacity and ferritin measurements
- Ferrokinetic studies using 59Fe
- Serum vitamin B 12 assay (microbiological or isotope method)
- Intrinsic factor antibody measurement
- Oxygen dissociation curve measurement
- Serum immunoglobulin measurement
- Immunoeletrophoresis and immunofixation of serum and urine
- Cryoglobulin and cryofibrinogen detection
- Serum complement measurement
- Antinuclear factor demonstration
- Cell surface marker studies using rosette and immunofluorescence tests
- Serum lysozyme measurement
- Terminal deoxynucleotidyl transferase (Tdt) assay,
- Plasma haptoglobin measurement
- Factor VIII: WF measurement
- Antithrombin III measurement
- Tests for platelet factor 3 availability,
- Tests for Hepatitis B surface antigen and antibody
- Blood grouping and antibody screening by automated techniques
- HLA typing
- Elution of antibodies from red cells
- Preparation of blood components for transfusion purposes