Department of Pathology and Laboratory Medicine
Division of Hematology and Transfusion Medicine

Hematopathology Training Program

GENERAL HEMATOLOGY AND PBS MORPHOLOGY

Goals & Objectives and Training Schedule

(Revised March 2016)

For: _____

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GOALS & OBJECTIVES

Peripheral blood smear morphology is often the first line tests of a patient with haematological signs and symptoms. From these tests, most of the more specialized hematology tests follow. Remember that although the patient is not physically present, each laboratory request is a *bona fide* patient consultation,

Calgary Laboratory Services performs approximately 2,000 complete counts per day, of which the cell counter, according to present parameters, flags approximately 6% of the samples. A laboratory technologist then reviews the samples, with special attention to blood cell morphology. A laboratory technologist may then refer the smear to a hematopathologist, or it may comply with the criteria that are specified in the standard operating procedures for referral to a hematopathologist.

The general hematology rotation also includes exposure to screening of G-6PD and Pyruvate kinase deficiencies, Eosin-5-maleimide flow cytometry for hereditary spherocytosis, ESR and body fluid cytospin.

Objectives & Learning Outcomes (CANMED Guidelines):

Medical Expert/Clinical Decision Maker:

- Use correct terminology in description of cells and understand the clinical significance of morphologic findings and quantitative abnormalities
- Principles of current technology of cell counters
- Erythrocyte sedimentation rate
- Principles of cell staining
- Red cell morphology and clinical relevance, including red cell inclusions, thalassemia, haemolytic anemias and red cell enzymopathies
- Normal white blood cell morphology and development as well as reactive cell morphology
- Neoplasia of the lymphocyte lineage
- Neoplasia of the granulocyte lineage
- Granulocyte dysplasia
- Hereditary granulocyte and lymphocyte morphologic abnormalities
- Platelet abnormalities – hereditary and acquired
- Know the laboratory methods in the workup of haemolytic anemias, including membrane defects and enzyme deficiencies.

Communicator:

- Develops skills in application of clinical history for interpretation of PBS specimens from patients of varied ages and clinical settings.
- Gains experience in dealing with abnormal finding of PBS specimens.
- Communication with technical staff and the extent of information could be acquired from them.
- Communicates and shares insights with the multidisciplinary teams.

Collaborator:

- Collaborates with laboratory colleagues and other health care personnel.
- Collaborates with outside physicians for follow up and continued management.
- Collaborates in different clinical settings to optimize the diagnostic results.

Manager:

- Learns to manage a laboratory

Health Advocate:

- Learns to become an advocate to involve and improve the diagnostic achievements by laboratory methods.

Scholar:

- Research the subjects that are listed under medical expert/decision maker
- Is encouraged to review the literature on a topic of interest in order to give a presentation toward the end of the rotation.
- Learns about the structure of clinical laboratory, the value of laboratory results and laboratory research in the management of patients.

Professional:

- Conducts himself/herself in a professional manner, demonstrating respect for the confidentiality and dignity of patients and their families.
- Demonstrates knowledge of his/her limitations.
- Accepts guidance and supervision from members of the multidisciplinary team.
- Recognizes the ethical and legal issues related to clinical laboratory services.

Learning Outcomes:

At the end of this rotation the resident will understand:

Technology

- Know the principles of current technology of cell counters.
- Understand the principle and limitations of the erythrocyte sedimentation rate
- Peripheral blood cell morphology and quantitative changes
- Use correct terminology in description of cells and understand the clinical significance of morphologic findings and quantitative abnormalities
- Know red cell morphology and the clinical relevance of abnormal morphologic findings including red cell inclusions, thalassemia, haemolytic anemias and red cell enzymopathies
- Know normal white blood cell morphology and development as well as reactive cell morphology
- Identify and classify neoplasia of the lymphocyte lineage
- Identify and classify neoplasia of the granulocyte lineage
- Identify and describe granulocyte dysplasia
- Identify and describe hereditary granulocyte and lymphocyte morphologic abnormalities
- Identify hereditary and acquired platelet abnormalities
- Microorganisms and parasites in the blood

- Identify bacterial and parasitic infections
- Body fluids
- Understand the principle of cytocentrifuge
- Be able to identify neoplastic cells in fluids
- Hemolytic anemias and abnormalities of globin chain synthesis
- Have a general approach to investigate haemolytic anemias
- Know the principles of the tests for red cell membrane defects and red cell enzyme deficiencies

Library:

- Blood Cells: A Practical Guide, 4th Edition, by Barbara J. Bain
- Practical Hematology, 10th Edition, Lewis SM, Bain BJ, Bates L
- Color Atlas of Hematology, College of American Pathologists
- Color Atlas of Body Fluids, College of American Pathologists
- For Aperio Access, contact Tom Krypton to set up an account for you: Thomas Kryton
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PBS Weekly Schedule

WEEK 1 - *Beckman Coulter and PBS staining lab contact: Brenda Wood - 944-1608*

Date	Time	Description of Activities	Assigned To
Monday,	09:30 – 10:00	Orientation	Doctor on service
	10:00 – 12:00	Reading: RBC	Doctor on service
	13:00 – 16:00	Review of cases and sign-out of PBS slides with the pathologist	
Tuesday	08:00 – 10:00	Laboratory: Beckman Coulter and PBS staining	
	10:00 – 12:00	Bone Marrow Rounds	7th Floor Multi-headed Microscope Lab
	13:00 – 16:00	Review of cases and sign-out of PBS slides with the pathologist	Doctor on service
Wednesday	09:00 – 12:00	Reading: Granulocytes	
	13:00 – 16:00	Review of cases and sign-out of PBS slides with the pathologist	Doctor on service
Thursday	09:00 – 10:00	Reading: Platelets	
	10:00	Lymphoma Review Session	7th Floor Multi-headed Microscope Lab
	12:00	Hematology Rounds	TBCC Rm CC104
	13:00	Clinical Lymphoma Rounds	TBCC Radiology Conference Room
	14:00 – 16:00	Resident academic half day	
Friday	09:00 – 12:00	Reading: Lymphocytes	
	13:00 – 16:00	Review of cases and sign-out of PBS slides with the pathologist	Doctor on service

WEEK 2 - *Arrange times for Cytocentrifuge, ESR, Sickle solubility test and G-6PD test observation. Contact: Brenda Wood 944-1608*

Date	Time	Description of Activities	Assigned To
Monday	09:00 – 12:00	Review teaching slides	
	13:00 – 16:00	Review of cases and sign-out of PBS slides with the pathologist	Doctor on service
Tuesday	09:00 – 10:00	Review teaching slides	
	10:00	Bone Marrow Rounds	7th Floor Multi-headed Microscope Lab
	13:00 – 16:00	Review of cases and sign-out of PBS slides with the pathologist	Doctor on service
Wednesday	09:00 – 12:00	Review teaching slides	
	13:00 – 16:00	Review of cases and sign-out of PBS slides with the pathologist	Doctor on service (TBA)
Thursday	09:00	Review teaching slides	
	10:00	Lymphoma Review Session	7th Floor Multi-headed Microscope Lab
	12:00	Hematology Rounds	TBCC Rm CC104
	13:00	Clinical Lymphoma Rounds	TBCC Radiology Conference Room
	14:00 – 16:00	Resident academic half day	
Friday	09:00 – 12:00	Review teaching slides	
	13:00 – 16:00	Review of cases and sign-out of PBS with the pathologist	Doctor on service

PBS Weekly Schedule

WEEK 3

Date	Time	Description of Activities	Assigned To
Monday	09:00 – 12:00	Self-review and reporting of peripheral blood smears	
	13:00 – 16:00	Review of PBS with the pathologist	Doctor on service
Tuesday	09:00 – 10:00	Self-review and reporting of peripheral blood smears	
	10:00	Bone Marrow Rounds	7th Floor Multi-headed Microscope Lab
	13:00 – 16:00	Review of cases and sign-out of PBS with the pathologist	Doctor on service
Wednesday	09:00 – 12:00	Self-review and reporting of peripheral blood smears	
	13:00 – 16:00	Review of cases and sign-out of PBS with the pathologist	Doctor on service
Thursday	09:00	Self-review and reporting of peripheral blood smears	
	10:00	Lymphoma Review Session	7th Floor Multi-headed Microscope Lab
	12:00	Hematology Rounds	TBCC Rm CC104
	13:00	Clinical Lymphoma Rounds	TBCC Radiology Conference Room
	14:00 – 17:00	Resident academic half day	
Friday	09:00 – 12:00	Self-review and reporting of peripheral blood smears	
	13:00 – 17:00	Evaluation	Doctor on service

Department of Pathology and Laboratory Medicine
Division of Hematology and Transfusion Medicine

Hematopathology Training Program

Hemoglobin Disorders

Goals & Objectives and Training Schedule

(Revised March 2016)

For: _____

Supervisor/Preceptor:

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GOALS & OBJECTIVES

GENERAL OBJECTIVES:

The resident/fellow spends one week in the Special Hemotology Laboratory. It is based at the 7th Floor, McCaig Tower, Foothills Medical Center, Calgary Laboratory Services. The emphasis of this rotation is on the appropriate workup of patients with hemoglobin disorder, interpretation of laboratory results, and clinical consultation.

General expectations:

1. Understand the genetics, biochemistry, and pathophysiology of hemoglobin disorders.
2. Become familiar with how hemoglobin tests are performed.
3. To know how to choose which hemoglobin testing methods are needed based on the patient's profile and laboratory data.
4. Exposure to molecular assays associated with hemoglobin disorder.

SPECIFIC OBJECTIVES:

At the completion of training week, the trainee will be familiar and will acquire understanding of the following competencies:

Medical Expert/Clinical decision-Maker competencies include:

1. Understand the decision making algorithm for screening of hemoglobinopathies
2. Understand the role of HPLC, hemoglobin gel electrophoresis and sickle cell screen in the workup of hemoglobinopathies
3. Understand when molecular analysis or genetic analysis for hemoglobinopathies are indicated
4. Demonstrate understanding of a role of consultative practice in hematopathology
5. Demonstrate understanding of the most common hemoglobin disorders

Communicator:

General Requirements:

- Establish effective working relationships with consulting physicians/hematologists.
- Obtain and synthesize relevant clinical history from physicians, electronic and written health records.
- Listen and respond effectively.
- Discuss in timely fashion appropriate information with the health care team.

Specific Requirements:

- Understand the role of a hematopathology consultant.
- Act as a consultant to clinical colleagues on the interpretation and relevance of pathological findings, with particular regard to their significance in the management of the patient.
- Understand the role pathologic findings should provide in a given clinical situation and be able to communicate it effectively and in a timely fashion in an oral and written form.
- Assist in the continuing education of clinicians and other members of the health care team.

Collaborator

General Requirements:

- Consult effectively with other physicians and health care professionals.
- Contribute effectively to other interdisciplinary team activities.

Specific Requirements:

- Must have experience in hemoglobin disorders sufficient to achieve a sound understanding of the effects of disease and the role of pathology in clinical management.
- Demonstrate the ability to advise on further appropriate investigations and management.

Manager

General Requirements:

- Utilize resources effectively to balance patient care, turn-around-time and educational/research needs.
- Allocate finite health care resources wisely.
- Work effectively and efficiently in a health care organization.
- Utilize information technology to optimize patient care, life-long learning and other activities.

Specific Requirements

- Demonstrate knowledge of the principles of laboratory management and administration.
- Demonstrate knowledge of the methods of quality control in the field of hemoglobin disorder.
- Demonstrate knowledge of the methods for professional quality assurance as applied to hemoglobin disorder.
- Demonstrate competence in basic computer skills with emphasis on automated electronic reporting, electronic communication and search strategies.

Health Advocate

General Requirements:

- Contribute effectively to improved health of patients and communities.
- Recognize and respond to those issues where advocacy is appropriate.
- Understand the role of consult hematopathology in patient's care.

Specific Requirements:

- As members of an interdisciplinary team of professionals responsible for individual and population health care, the consult hematopathologist will endeavour to ensure that laboratory practices and test selection are regularly evaluated to determine that they meet these communities' needs.
- Reinforce to the public and to the profession the essential contribution of laboratory medicine to health.

Scholar

General Requirements:

- Develop, implement and monitor a personal continuing education strategy.
- Critically appraise sources of medical information.
- Facilitate learning of patients, house staff/students and other health professionals.
- Contribute to development of new knowledge.

Professional

General Requirement:

- Deliver highest quality patient care.
- Exhibit appropriate personal and interpersonal professional behaviours.
- Practise medicine ethnically consistent with obligations of a physician.
- Demonstrate the knowledge, skills and attitudes relating to gender, culture, and ethnicity pertinent to special coagulation.

Specific Requirements

- Act as an appropriate role model for students and others.
- Demonstrate a professional attitude to colleagues and other laboratory staff.
- Have an appreciation of the crucial role of the hematopathologist in providing quality patient care. This will include knowledge of an individual professional limitations and the necessity of seeking appropriate second opinions.

Learning outcomes:

At the end of this rotation the resident will understand:

- Know the principles of Hemoglobin gel electrophoresis, HPLC, sickle cell screen and molecular analysis for alpha thalassemias
- Understand the laboratory workup of hemoglobinopathies

SUGGESTED READING:

1. Color Atlas of hemoglobin disorders James D. Hoyer, MD, Steven H. kroft, MD, College of American Pathologists (CAP), 2003
2. Haemoglobinopathy Diagnosis Barbara J. Bain second edition 2006
3. Lecture available on CLS-G drive: Case studies on hemoglobin disorders

Hemoglobin Disorder Schedule

WEEK 4

Date	Time	Description of Activities	Assigned To
Monday	09:30 – 10:00	Orientation	Dr. Fourie / Dr. Jiang Lab Tech or Supervisor
	10:00 – 12:00	Hemoglobinopathy bench	Lab Tech or Supervisor
	12:00 – 13:00	Lunch break	
	13:00 – 16:00	Hemoglobinopathy bench/self-directed reading/hemoglobinopathy sign-out Reading: Beta thalassemia	Lab Tech or Supervisor
Tuesday	08:00 – 10:00	Molecular Lab (alpha thalassemia only)	Lab Tech or Supervisor
	10:00 – 12:00	Bone Marrow Rounds	7th Floor Multi-headed Microscope Lab
	12:00 – 13:00	Lunch break	
	13:00 – 16:00	Hemoglobinopathy bench/self-directed reading/hemoglobinopathy sign-out Reading: Alpha thalassemia	Resident/fellow
Wednesday	08:00 – 10:00	Hemoglobinopathy bench	Lab Tech or Supervisor
	10:00 – 12:00	Reading: Variant hemoglobins	
	12:00 – 13:00	Lunch break	
	13:00 – 16:00	Hemoglobinopathy bench/self-directed reading/hemoglobinopathy sign-out Reading: Variant hemoglobins	Lab Tech or Supervisor
Thursday	08:00 – 10:00	Hemoglobinopathy bench	Lab Tech or Supervisor
	10:00 – 12:00	Lymphoma Review Session	7th Floor Multi-headed Microscope Lab
	12:00 – 13:00	Hematology Rounds	TBCC Rm CC104
	13:00 – 16:00	Resident academic half day	Resident/fellow
Friday	08:00 – 10:00	Hemoglobinopathy bench	Lab Tech or Supervisor
	10:00 – 12:00	Reading: Self-directed	
	12:00 – 13:00	Lunch break	
	13:00	Evaluation	Pathologist

*** Arrange for observation of sickle cell screen during the course of the week.**
Laboratory contact: Mireille Lareau (944-8070)