Educational Goals and Objectives – Hematopathology Program

Faculty: Dr. P. Kaur, Dr. D. Ornstein, Dr. G. Tsongalis; Dr. E. Loo; Dr. L. Tafe
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Length of Program: 1 year

The ***philosophy*** of the program is to provide fellows with requisite training to become excellent diagnostic hematopathologists.

Goals:
The fellows will train in diagnostic pathology; will develop teaching skills, academic skills and administrative abilities. This institution provides graded educational responsibilities in clinical hematology/oncology, pathology and laboratory medicine. Training is focused on skills requisite for specimen collection, processing and interpretation with background information regarding disease pathogenesis, clinical correlation and prognostic significance. Interpretation of coagulation profiles, hemoglobin electrophoresis and ancillary techniques like flow cytometry, cytogenetics/FISH, molecular pathology are used in assessment of hematologic disease. By the end of the training the fellow should be capable of assuming the position of Medical Director of the Hematology/Coagulation laboratory in an academic tertiary level hospital.

***Expectations*:**
The fellow will:

- Preview and prepare cases with appropriate recommended readings and literature search.
- Review teachings sets.
- Develop teaching skills by conducting conferences and lectures for laboratory technologists, pathology residents, clinical hematology fellows and clinicians and by participating in laboratory sessions for second year medical students in the pathophysiology course.
- Develop academic skills by completing at least one clinicopathologic study.
- Develop administrative abilities through direct instruction during the general hematology portion of their rotation. The fellow will be required to attend a subset of the monthly hematopathology section meetings and the hematopathology management meetings.

***Skills*:** Graded at Core I, Core II, and Core III.
The fellow, at the beginning of training, will be expected to have basic skills in grossing surgical specimens and rudimentary information in informatics science and knowledge of common hematological disorders. In the first half of the training, the fellow will be expected to prepare cases by previewing the cases and read basic literature pertaining to the case before sign-out. During sign-out with the staff hematopathologist, there will be teaching sessions, advice on follow–up with ancillary techniques and guide on writing preliminary reports. During the second half of training the fellow will be expected to perform as junior faculty. The fellow will preview the case, review literature, follow it up with appropriate ancillary techniques, write up the report and hand it in to the hematopathologist as a final report ready to be signed out. This will simulate "real life" and help the fellow ascertain his/her level of confidence in signing out cases. The fellow will also be expected to independently communicate with the clinicians regarding clinical concerns and diagnosis.

These are in sync with the ACGME/RRC competencies.

***Knowledge*:**

The fellow will be expected to be informed in the following topics in the Core rotations. These may be covered during signing out of clinical cases and review of teaching sets.

I. Hematologic disorders (Bone marrow rotation)

A. Normal: Normal peripheral blood smears Normal bone marrow smears

B. Acute and Chronic lymphoproliferative Disorders
- Acute lymphoblastic leukemia (pre- T-cell and pre-B-cell)
- Chronic lymphocytic leukemia
- Prolymphocytic leukemia
- Lymphoplasmacytic lymphoma
- Splenic marginal zone lymphoma
- Hairy cell leukemia
- Mantle cell lymphoma
- Follicular lymphoma
- Large B-cell lymphoma
- Burkitt's lymphoma
- T-cell granular lymphocytic leukemia
- Aggressive NK-cell leukemia
- Adult T -cell leukemia/lymphoma
- Hepatosplenic gamma/delta T -cell lymphoma
- Mycosis fungoides
- Anaplastic large cell lymphoma
- Peripheral T -cell lymphoma
- Hodgkin lymphoma (all subtypes)
- Post-transplant lymphoproliferative disorders

C. Plasma Cell Proliferative Disorders
- Plasma cell proliferative disorders (MGUS)
- Smoldering multiple myeloma
- Multiple myeloma
- Plasma cell leukemia

D. Acute and Chronic Myeloproliferative Disorders
- Acute myeloid leukemia (all morphologic and genetic subtypes)
- Myelodysplastic syndromes (all morphologic and cytogenetic subtypes)
- Chronic myelogenous leukemia
- Polycythemia Vera
- Agnogenic myeloid metaplasia
- Myeloid metaplasia with myelofibrosis
- Essential thrombocythemia
- Chronic myelomonocytic leukemia
- Chronic neutrophilic leukemia
- Hypereosinophilic syndrome
- Systemic mastocytosis (all variants)
- Juvenile myelomonocytic leukemia

E. Benign/reactive Hematologic Conditions
- Constitutional and reactive disorders of megakaryocytes
- Reactive lymphoid proliferations in blood and bone marrow
- Constitutional and reactive myeloid disorders
- Erythrocytoses

- Congenital and acquired anemias

II. Hematolymphoid disorders: Lymph Node Rotation

A. Normal lymph node embryology, anatomy, histology and physiology

- B-cell ontogeny, subsets, function in immune reactions
- T-cell ontogeny, subsets, function in immune reactions
- Dendritic cell ontogeny, subsets, function in immune reactions

Follicular hyperplasia

- Syphilitic lymphadenitis
- Lymphadenitis of rheumatoid arthritis
- CMV -associated lymphoid hyperplasia
- Toxoplasmic lymphadenitis
- Cytomegalovirus lymphadenitis
- Progressive transformation of germinal centers
- Follicle lysis
- Kimura's disease
- Castleman's disease

Paracortical hyperplasia/I Immunoblastic reaction

- Epstein Barr Virus
- Autoimmune disorders (juvenile rheumatoid arthritis, systemic lupus erythematosus)
- Hypersensitivity reactions
- Kikuchi's histiocytic necrotizing lymphadenitis
- Other viral infections

Granulomatous lymphadenitis

- Tuberculosis
- Atypical mycobacterial infections
- Cat scratch disease(necrotizing granulomatous lymphadenitis with neutrophils)
- Fungal infections
- Churg-Strauss syndrome

Histiocytic disorders

- Sinus histiocytosis
- Histiocytic hyperplasia associated with large joint replacement
- Lysosomal storage disorders
- Hemophagocytic syndromes
- Sinus histiocytosis with massive lymphadenopathy (Rosai-Dorfman)
- Whipple disease
- Langerhans' cell histiocytosis
- Leishmaniasis

Vascular and stromal disorders

- Inflammatory pseudotumor
- Vascular transformation of lymph node sinuses
- Hemangioma, various types
- Lymphangioma
- Angiomyomatous hamartoma
- Hemorrhagic spindle cell tumor with amianthoid fibers
- Mycobacterial spindle cell pseudotumor of lymph node
- Bacillary angiomatosis

Lymphomas

B-cell neoplasms

Precursor B-cell neoplasm: Precursor B-Iymphoblastic leukemia/lymphoma

Mature (peripheral) B-cell neoplasms

- B-cell chronic lymphocytic leukemia/SLL
- B-cell prolymphocytic leukemia
- Lymphoplasmacytic lymphoma
- Splenic marginal zone B-cell lymphoma (+/- villous lymphocytes)
- Hairy cell leukemia
- Plasma cell myeloma/plasmacytoma
- Extranodal marginal Zone B-cell lymphoma of MALT type
- Nodal marginal zone B-cell lymphoma (monocytoid B cells)
- Follicular lymphoma
- Mantle cell lymphoma
- Diffuse large B-cell lymphoma
  - Mediastinal large B-cell lymphoma
  - Primary effusion lymphoma
- Burkitt's lymphoma/Burkitt's cell leukemia

T and NK-cell neoplasms

Precursor T -cell neoplasm, Precursor T -lymphoblastic lymphoma/leukemia

Mature (peripheral) T-cell neoplasms

- T-cell pro lymphocytic leukemia
- T -cell granular lymphocytic leukemia
- Aggressive NK-cell leukemia.
- Adult T –cell lymphoma/leukemia (HTLV1 +)
- Extranodal NK/T-cell lymphoma, nasal type
- Enteropathy type T -cell lymphoma
- Hepatosplenic T -cell lymphoma
- Subcutaneous panniculitis-like T -cell lymphoma
- Mycosis fungoides/Sezary syndrome
- Anaplastic large cell lymphoma, T/null cell, cutaneous type
- Peripheral T -cell lymphoma, not otherwise characterized
- Angioimmunoblastic T -cell lymphoma
- Anaplastic large cell lymphoma, T/null cell, primary systemic type

Hodgkin's lymphoma

- Nodular lymphocyte predominance Hodgkin lymphoma
- Classical Hodgkin's lymphoma
  - Nodular sclerosis Hodgkin's lymphoma (Grades 1 and 2)
  - Lymphocyte-rich classical Hodgkin's lymphoma
  - Mixed cellularity Hodgkin's lymphoma
  - Lymphocyte depletion Hodgkin's lymphoma

Post-transplant Iymphoproliferative disorders (PTLD)

- Early lesions
  - Reactive plasmacytic hyperplasia
  - Infectious mononucleosis-like
- PTLD - polymorphic
  - Polyclonal (rare)
  - Monoclonal
- PTLD monomorphic (classify: according to lymphoma classification)

- B-cell lymphomas
  - Diffuse large B-cell lymphoma
  - Burkitt's/Burkitt's-like lymphoma
  - Plasma cell myeloma
- T-cell lymphomas
  - Peripheral T -cell lymphoma, not otherwise categorized
  - Other types (hepatosplenic, gamma-delta, T/NK)
- Other types (rare)
  - Hodgkin disease-like lesions (with methotrexate therapy)
  - Plasmacytoma-like lesions

B. Splenic disorders

Normal splenic anatomy, embryology, histology and physiology

Hemolysis/Thrombocytopenia

- Autoimmune hemolysis
- Hemolysis due to inherited red blood cell membrane disorders (spherocytosis, elliptocytosis, etc.)
- Malaria
- Immune mediated thrombocytopenia(ITP)

Lysosomal Storage disorders

- Gaucher disease
- Sea blue histiocytoses
- Neiman-Pick disease

Lymphoid hyperplasia

- Follicular hyperplasia
- Marginal zone B-cell hyperplasia
- T -zone hyperplasia as seen in EBV infections
- Autoimmune disorders
- Immunodeficiency disorders

Vascular disorders and tumors

- Chronic congestion
- Hamartoma
- Littoral cell angioma
- Hemangioma
- Hemangioendothelioma
- Angiosarcoma

Patterns of involvement by lymphomas

- White pulp disorders: follicular lymphoma, mantle cell lymphoma, MZL, SL
- Red pulp disorders: SLL/CLL, LPL, intravascular lymphomatosis, hepatosplenic T -cell lymphoma, T-cell granular lymphocytic leukemia, T-cell chronic lymphocytic leukemia/prolymphocytic leukemia, lymphoblastic leukemia/lymphoma.
- Tumors: large cell lymphomas, Hodgkin's lymphoma

Myeloid disorders

- Chronic myeloid leukemia
- Chronic myeloproliferative disorders
- Myelodysplastic syndromes
- Acute myeloid leukemia
- Juvenile myelomonocytic leukemia