

**PULMONARY
PATHOLOGY FELLOWSHIP**

**The Department of Pathology and Laboratory Medicine
University of Calgary
Calgary, Alberta**

Description and Objectives

PULMONARY PATHOLOGY FELLOWSHIP

Description

Fellowship Director: Margaret M. Kelly

Fellowship purpose:

- To train pathologists to understand and diagnose routine, complex and esoteric pathologic specimens from the lung, pleura and mediastinum
- To train pathologists to effectively educate and communicate with medical students, trainees, other pathologists and clinicians regarding diseases of the lung, pleura and mediastinum
- To advance the discipline of pulmonary pathology.

The Pulmonary Pathology Fellowship Program will be administered under the auspices of the Division of Anatomic Pathology and will be mostly based at the Foothills Medical Centre.

Curriculum: The Fellow is expected to be present in the department during laboratory working hours: Monday - Friday, 8:00 a.m. to 5:00.p.m. The curriculum consists of rotations through the Pulmonary Pathology Consult services (8 months), pediatric pathology (1 month) and research (3 months). Participation in the Pulmonary Pathology Consult service will include coverage of frozen section activities (of lung, pleura and mediastinal lesions), in collaboration with surgical pathology residents and faculty. It will also include observing various surgical techniques related to lung. This will include observing VATS, open lung resections, transbronchial biopsies and EBUS procedures. These will be co-ordinated with Dr. Gary Gelfand (head of thoracic surgery) and Dr. Alain Tremblay (head of interventional pulmonology).

To supplement the “on the job” learning, the fellow will utilize Dr. Kelly’s pulmonary pathology teaching collection, relevant cases from the departmental teaching collection, participate in medical student teaching, and participate in regularly scheduled interdisciplinary conferences including a multi-institutional journal club.

The fellow will be expected to achieve all of the competencies outlined in the Pulmonary Pathology Fellowship Objectives (see below).

Fellow Evaluations will be performed by faculty in the course of signout, and by the Fellowship Director on a quarterly basis. If the performance is unsatisfactory, a further 3 months of training will occur. Performance at the end of that period will be evaluated and if unsatisfactory, the training will be terminated.

Conference Participation: Fellows will participate in all lung-related rounds as well as those deemed to be useful as outlined in the Objectives.

Publication: Fellows will be required to participate in at least one project prior to graduation from the program that is likely to result in a peer-reviewed publication.

Certification: Upon successful completion of the fellowship, the candidate will be issued a formal certificate.

**PULMONARY PATHOLOGY FELLOWSHIP
Orientation**

1- General orientation with all other Anatomic Pathology fellows and residents

2- Specific 1 hour orientation focused on the Pulmonary Pathology Fellowship:

- a. Review of the curriculum
- b. Review of objectives and evaluations for the pulmonary pathology rotations
- c. Review of the teaching files
- d. Review of conferences specific to Pulmonary Pathology Fellowship:
 - i. Interstitial Lung Disease rounds: Monthly, Friday 8 am.
 - ii. Thoracic Tumor Pathology rounds: Monthly, Friday 12 pm
 - iii. Interstitial Lung Disease working rounds, Monthly, Thursday 7 am
 - iv. Pulmonary Pathology journal club, Monthly www.pulmpathrev.typepad.com
 - v. Airway Inflammation Research Group rounds: Weekly, Thursday 12 pm

For rounds (i) and (ii), the fellow will present cases and prepare a short (5 minute) review of relevant points of the case. The fellow will join the monthly teleconference journal club, and will identify a minimum of 2 articles for presentation when it is the University of Calgary's turn to present (once a year).

- e. Review of conferences not specific to Pulmonary Pathology Fellowship:
 - i. Unknown Slide Rounds: Weekly, Friday 8 am.
(When ILD rounds are not scheduled)
 - ii. Autopsy rounds: Weekly, Friday 9 am.
 - iii. Pathology Grand Rounds: Weekly, Thursday 4.30 pm

For rounds (i) and (iii), the fellow is expected to present at least once.

- f. Review of research interests, potential projects and expectations

PULMONARY PATHOLOGY FELLOWSHIP Objectives

- 1- Acquires knowledge, including typical clinical presentation as well as pathologic criteria, of common as well as uncommon non-neoplastic lung diseases (Appendix 1).

Patient care, medical expert, practice based learning and improvement and system based practice

- Review of current cases, including consultations and in-house material, surgical, biopsies and autopsies, with faculty member
- Dictation of case-related reports and correspondence as appropriate
- Review of teaching file cases to supplement current case material as appropriate
- Read appropriate text book chapters or articles related to topics
- Do literature review of unusual topics
- Participate in monthly Journal Club (JC)

Evaluation: Global assessment, discussion of JC articles presented by fellow

- 2- Acquires knowledge of common and uncommon neoplastic lung diseases (Appendix 2).

Patient care, medical expert, practice based learning and improvement and system based practice

- Review of current cases, including consultations and in-house material, surgical, biopsies and autopsies, with faculty member
- Dictation of case-related reports and correspondence as appropriate
- Review of teaching file cases to supplement current case material as appropriate
- Read appropriate text book chapters or articles related to topics
- Do literature review of unusual topics
- Participate in monthly Journal Club (JC)

Evaluation: Global assessment, discussion of JC articles presented by fellow

- 3- Recognizes and acquires pertinent clinical and radiologic information for the interpretation of lung diagnoses.

Professionalism, patient care, medical expert, practice based learning, communication skills.

- For surgical specimens, including those reviewed as part of intramural consults or in the course of frozen section, seeks information relevant to pathological interpretation using electronic tools as appropriate (*i.e.* Millenium and Netcare) and if information not adequate, proactively consults referring physicians, as appropriate.
- For extramural consultation cases, identifies pertinent information from material received including review with chest radiologist of outside imaging studies as appropriate. If information not available from material received, proactively contacts referring physicians, as appropriate.

Evaluation: Global assessment and monthly review by participating faculty members

4- Understands the clinical significance of diagnosis rendered.

Professionalism, patient care, medical expert, systems-based practice, collaborative and communication skills.

- For intramural cases seen as peer-to-peer consultations or in the course of routine surgical specimens, demonstrates the ability to discuss results with pathology peers, surgeons or pulmonologists as indicated. Demonstrates the ability to construct appropriate surgical reports.
- For frozen section cases, demonstrates the ability to effectively communicate with operating surgeons in a timely fashion.
- Participates in interdisciplinary case review conferences, including the bi-monthly Interstitial Lung Disease conferences and the monthly Thoracic Tumor Pathology conference.
- For extramural consultation cases, demonstrates the ability to discuss implication of diagnosis in terms of prognosis and potential treatment with attending faculty and referring pathologist. Demonstrates the ability to dictate diagnoses and consultation letters to referring physicians conveying this information.
- For both intramural and extramural cases, demonstrates the understanding of rapid TAT critical to good patient care.

Evaluation: Global assessment, monthly assessment of participating faculty

5- Demonstrates appropriate and cost-effective use of ancillary techniques in work up of pulmonary, pleural and mediastinal specimens.

Patient Care, Practice-based learning and System-based practice. Manager skills

- Is capable of discussing the value and role of immunohistochemical studies, immunofluorescence, electron microscopy and molecular diagnostic techniques in the clinical evaluations of neoplastic and non-neoplastic lung, pleural and mediastinal diseases
- Understands the costs of these ancillary studies
- Assists in establishing best practices in work-up of pulmonary, pleural, and mediastinal specimens

Evaluation: Global assessment, review by participating faculty

6- Acquires procedural and gross-microscopic correlation skills related to thoracic surgical specimens.

Professionalism, patient care, medical expert.

- Demonstrates ability to gross surgical specimens such as wedge biopsy, lobectomy and pneumonectomy for both neoplastic and non-neoplastic disease, including explant lung for allograft transplantation.
- Photographs specimens as appropriate.
- Capable of expressing differential diagnosis of macroscopic lesions

- Demonstrates understanding of disease process by determining appropriate technique for grossing and appropriate sampling for microscopic sections

Evaluation: Global assessment and check list

7- Participate in resident and medical student education.

Professionalism, patient care, practice-based learning, communication skills

- Assist residents with grossing activities and review of histologic sections in the course of frozen section rotations
- Assist residents with review of lung cases received as intramural consultation cases
- Assist with medical school teaching as appropriate

Evaluation: 360 degree review from residents and medical students.

8- Participates in research project.

Practice-based learning, scholar

Evaluation: Updated CV at end of fellowship

9- Demonstrates respect and good working relationship with all support staff, including secretaries, technicians, PA, residents, and consultants.

Professionalism and interpersonal skills, management, collaborative and communication skills.

- Is familiar with vision, mission and core values of Anatomic Pathology
- Has positive and constructive interactions with all members of the team.
- Is capable of accepting constructive criticism.
- Demonstrates helpful demeanor such as assisting with cases, grossing, or other shared activities.
- Is punctual.
- Ensures coverage for absences when necessary and informs faculty if delays are to occur

Evaluation: 360 degree evaluation including allied health staff and residents

10- Identifies and accomplishes various quality activities.

Practice-based learning and system-based practice

- Resolution of case discrepancies discovered in the course of practice or conference participation
- Resolution of any laboratory defects discovered in the course of practice

Evaluation: Global assessment and fellow portfolio

11- Demonstrates familiarity with CAP accreditation standards for Surgical Pathology laboratories including Lab safety guidelines. **Practice-based learning, management skills**

Evaluation: 360 evaluation including Lab supervisors

Pathologists with an interest in lung pathology:

Dr. Francis Green: Non-neoplastic, autopsy

Dr. Margaret Kelly: Non-neoplastic and neoplastic

Dr. Moosa Khalil: Neoplastic, Cytopathology

Dr. Anna Sienko: Non-neoplastic, neoplastic and cytopathology

Dr. Stefan Urbanski: Neoplastic

Dr. Weiming Yu: Pediatric

Pulmonary Books: These are available within the department.

Required reading:

- Katzenstein and Askin's Surgical Pathology of Non-Neoplastic Lung Disease. Anna-Luise A Katzenstein. 2006 (4th Ed).
- Practical Pulmonary Pathology. Kevin O Leslie and Mark R Wick. 2011 (2nd Ed).
- Tumors of the Lower Respiratory Tract (Atlas of Tumor Pathology, 3rd Series, Vol 13). Thomas V Colby, Michael N Koss, William DMD Travis. 1995.

Recommended reading:

Books:

- Dail and Hammar's Pulmonary Pathology: Volume 1: Non-neoplastic Lung Disease Volume 2: Neoplastic Lung Disease. Philip T Cagle, Carol Farver, Armando E Fraire and Joseph F Tomashefski. 2008 (3rd Ed).
- Thurlbeck's Pathology of the Lung. Andrew Churg, Jeffery Myers, Henry Tazelaar, Joanne Wright. 2005 (3rd Ed).
- Color Atlas and Text of Pulmonary Pathology. Philip T Cagle, Timothy C Allen, Roberto Barrios, Carlos Bedrossian, Abida K Haque, Alvaro C Laga, Mary L Ostrowski and Dani S Zander. 2004 (1st Ed).

Journals:

A J Surg Pathol

A J Clin Pathol

Advances Anat Pathol

Am Rev Resp Crit Care Med

Archives Pathol Lab Med

Cancer

Chest

Eur Respir J

Histopathology

Human Pathol

J Heart Lung Transplant

J Thorac Cardiovasc Surg

Lung Cancer

Modern Pathol

NEJM

Sem Diag Path

Thorax

Appendix 1 – Non-neoplastic Lung Diseases

1. Pediatric disease

- A. Congenital and acquired cystic lesions
- B. Diffuse lung diseases of newborns and infancy

2. Infections

- A. Bacterial
 - 1. Common
 - 2. Unusual including Legionnaires disease, Nocardiosis and Actinomycosis
- B. Mycobacterial
 - 1. Mycobacterial tuberculosis
 - 2. Atypical mycobacterial
- C. Fungal
 - 1. Aspergillosis-invasive, semi-invasive/cavitary, mycetoma,
 - 2. Coccidioides
 - 3. Cryptococcosis
 - 4. Histoplasmosis
 - 5. Blastomycosis
 - 6. Mucormycosis
 - 7. *Pneumocystis jiroveci*
- D. Viral
 - 1. CMV
 - 2. HSV/Varicella
 - 3. Adenovirus
 - 4. SARS
 - 5. Influenza, RSV, parainfluenza
- E. Diroflilaria

3. Diffuse Lung Disease

- A. Diffuse alveolar damage/acute interstitial pneumonia
- B. Usual interstitial pneumonia/idiopathic pulmonary fibrosis
- C. Desquamative interstitial pneumonia
- D. Respiratory Bronchiolitis (RB) and RB-interstitial lung disease
- E. Non-specific interstitial pneumonia
- F. Non-classifiable interstitial pneumonias
- G. Organizing Pneumonia/Cryptogenic organizing pneumonia
- H. Lymphocytic interstitial pneumonia
- I. Sarcoidosis and its variants
- J. Langerhans' cell histiocytosis
- K. Pulmonary alveolar proteinosis
- L. Lymphangiomyomatosis
- M. Diffuse pulmonary lymphangiectasis

4. Allergic lung disease

- A. Extrinsic allergic alveolitis/Hypersensitivity Pneumonitis
- B. Eosinophilic pneumonia-acute and chronic
- C. Drug reactions

5. Airway and obstructive disease

- A. Asthma
- B. Bronchiolitis, including constrictive (obliterative) bronchiolitis
- C. Bronchiectasis (including cystic fibrosis)
- D. Follicular bronchiolitis
- E. Aspiration
- F. Allergic bronchopulmonary fungal disease
- G. Emphysema
- H. Bullae/Blebs

6. Vascular disease

- A. Emboli and infarcts
- B. Pulmonary hypertension
 - 1. Chronic passive congestion
 - 2. Thrombotic pulmonary hypertension
 - 3. Plexogenic pulmonary hypertension
 - 4. Veno-Occlusive Disease
 - 5. Pulmonary capillary hemangiomatosis
- C. Vasculitis
 - 1. Wegener granulomatosis
 - 2. Churg Strauss syndrome
 - 3. Microscopic polyangiitis
- D. Pulmonary hemorrhage
 - 1. Wegener granulomatosis
 - 2. Goodpasture syndrome
 - 3. Idiopathic pulmonary hemosiderosis
 - 4. Other
- E. Intravenous Drug Abuse/IV talcosis

7. Pneumoconiosis

- A. Coal worker's
- B. Silicosis
- C. Asbestosis
- D. Berylliosis
- E. Mixed dust
- F. Hard metal disease/giant cell interstitial pneumonia

Appendix 2 – Neoplastic Lung Diseases

1. Benign neoplasms

- A. Hamartoma/Chondroma
- B. Sclerosing hemangioma
- C. Papillomas
- D. Adenomas (papillary, pleomorphic, alveolar)
- E. Clear cell tumor
- F. Multifocal Micronodular pneumocyte hyperplasia
- G. Meningothelial-like nodule

9. Low grade/malignant non-epithelial neoplasms

- A. Pleuropulmonary blastoma
- B. Inflammatory myofibroblastic tumor
- C. Solitary fibrous tumor
- D. Epithelioid hemangioendothelioma
- E. Synovial sarcoma
- F. Kaposi sarcoma

10. Malignant epithelial neoplasms and precursor lesions

- A. Squamous cell carcinoma
- B. Small cell carcinoma
- C. Adenocarcinoma and variants
- D. Large cell carcinoma and variants (large cell neuroendocrine, basaloid carcinoma)
- E. Sarcomatoid carcinoma (pleomorphic, spindle cell, giant cell, pulmonary blastoma)
- F. Large cell neuroendocrine
- G. Carcinoid tumors (typical and atypical)
- H. Neoplasms of salivary gland origin
- I. Metastatic carcinomas

12. Hematolymphoid Processes

- A. Nodular lymphoid hyperplasia
- B. Low grade lymphomas including MALT lymphomas
- C. High grade lymphomas including post transplant lymphoproliferative disease
- D. Lymphomatoid granulomatosis-lymphoma
- E. Leukemic infiltrates
- F. Erdheim-Chester disease
- G. Dendritic cell sarcomas

13. Pleural disease

- A. Mesothelioma
- B. Reactive and fibrotic mesothelial processes
- C. Vascular neoplasms

14. Lung transplant pathology

- A. Post operative changes
- B. Acute rejection
- C. Chronic rejection
- D. Other changes

15. Bone marrow transplant pathology

16. Miscellaneous pathology

- A. Calcification and ossification
- B. Amyloid
- C. Connective tissue involvement
- D. AIDS involvement
- E. Other immunodeficiency

17. Mediastinal disease

- A. Thymoma
- B. Sclerosing mediastinitis