



COLLEGE of AMERICAN
PATHOLOGISTS

Exploring Anatomic and Clinical Pathology

An Overview for Medical Students

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Meet Our Speakers

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Introduction

Pathology Divisions

Anatomic Pathology (AP)

Clinical Pathology (CP)



Residency Training Paths

AP only (3 years)

Combined AP/CP
(4 years)

CP only (3 years)

Fellowships/ Areas of Subspecialty Available

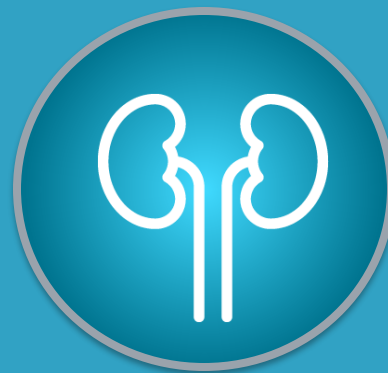
Anatomic Pathology



General Surgical Pathology



Pulmonary Pathology



GU Pathology



Forensic Pathology



Pediatric Pathology



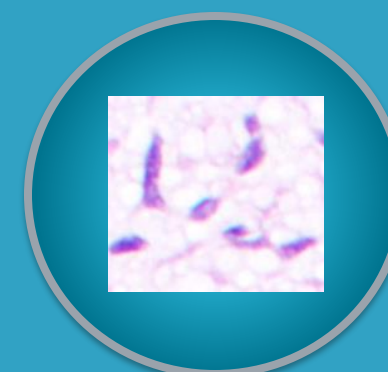
Breast Pathology



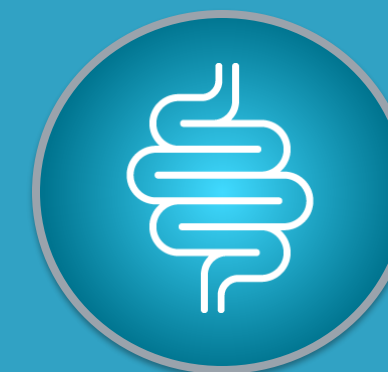
GYN Pathology



Cytopathology



Soft Tissue & Bone Pathology



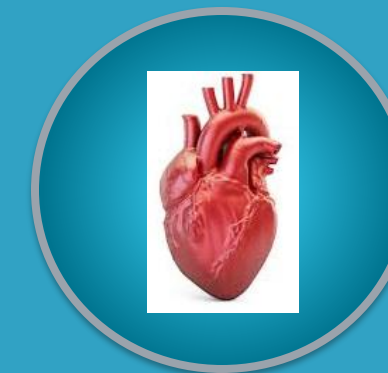
GI Pathology



Head & Neck
Pathology



Neuropathology



Cardiovascular
Pathology

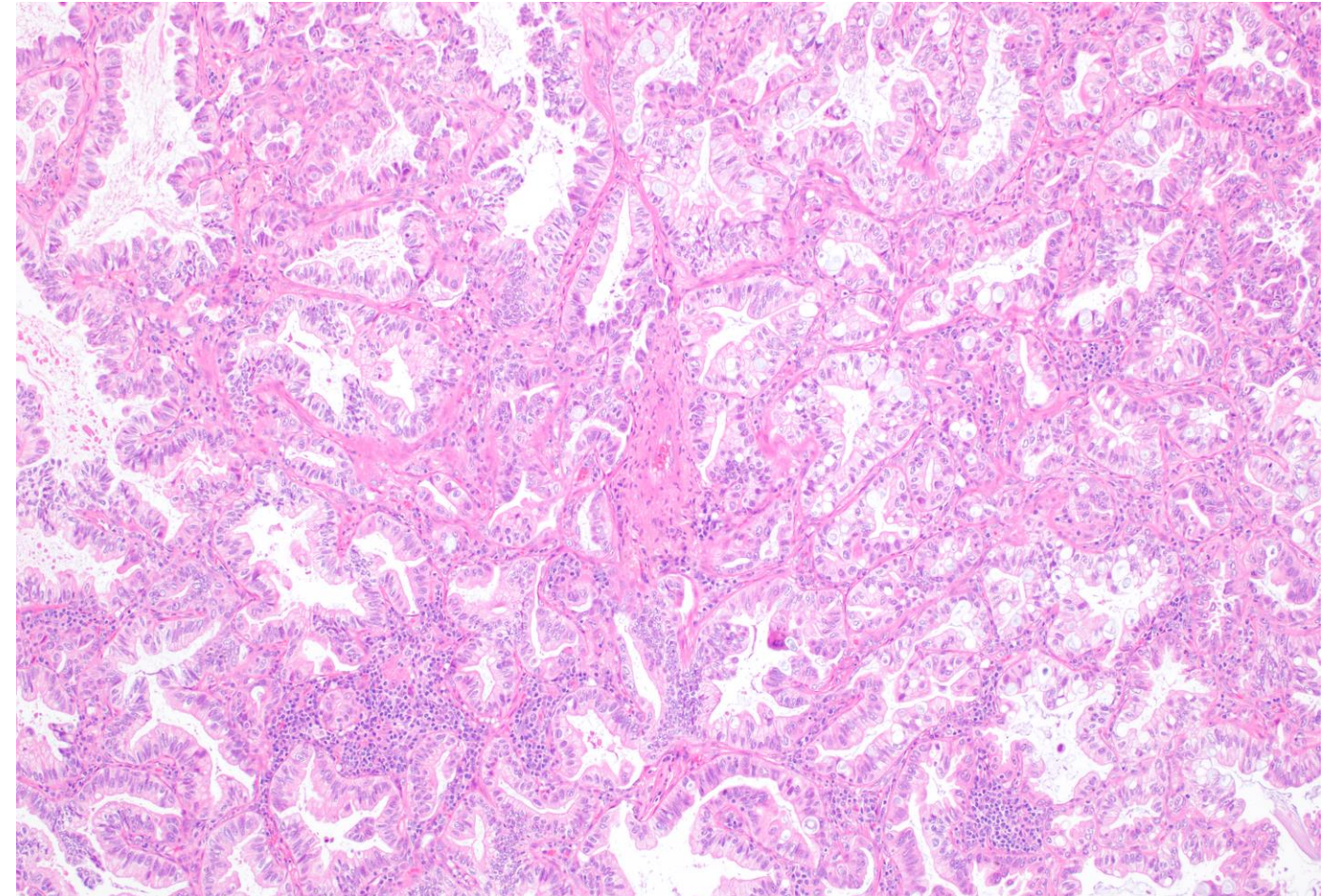


Hematopathology

Typically, 1 year
(average 1-2
fellowships)

What is anatomic pathology?

- **Focuses on the study of structural changes in tissues and organs.**
 - Examines:
 - Biopsy Specimens
 - Surgical Specimens
 - Autopsies
- **What skills do residents learn in AP rotations?**
 - tissue grossing
 - Histology interpretation
 - Autopsy techniques



Anatomic Subspecialties

- **Surgical Pathology**
 - Gross dissection
 - Histologic evaluation
 - Preparation and interpretation of frozen sections
- **Cytopathology**
 - Study of diseases on a cellular level
- **Forensic Pathology**
 - Perform autopsies to determine the cause of death

Surgical Pathology Rotation Structure

- **Macroscopic Pathology/Grossing:** Defines the process by which specimens are prepared for processing
- **Histologic Evaluation:**
 - What does histologic evaluation entail during residency?
 - What may one diagnose in a given day?
- **Frozen Sections:**
 - Who requests it?
 - What is the importance of a frozen
 - Outcomes from a frozen:
 - Access margins of a squamous cell carcinoma on the face
 - Confirm the neurosurgeon collected neoplastic tissue from an edematous tumor

Cytopathology

- **Study of diseases on a cellular level**
- **Examine cells in:**
 - **Pap smears**
 - **Fine needle aspirations (FNAs)**
 - **Fluids such as pleural fluid or ascitic fluid from the abdomen**
- **Diagnostic approach:**
 - **Relies on subtle cellular features to distinguish malignant from benign.**
 - **Classifies cells based on origin to direct further action (or inaction) for the patient.**

Cytopathology- continued

- Procedures include:
 - FNAs
 - Allows pathologists and residents to interact directly with patients and perform procedures, increasingly used for minimal tissue acquisition and molecular studies.
- Clinical Services:
 - Real-time services to clinicians who are collecting samples for cytology— determine whether a sample is adequate for cytologic evaluation or not
 - Daily diagnoses may include:
 - Breast carcinoma
 - Malignant lung tumor
 - Benign salivary gland mass

Forensic Pathology

- **Autopsy pathologists evaluate the deceased to determine why they died.**
- **Work closely with law enforcement to determine the manner and cause of death.**
- **Required to appear in court from time to time to explain autopsy findings.**
- **Includes hospital autopsies to determine why patients died in the hospital.**
- **Residents are required to participate/conduct a specified number of autopsies by the end of residency.**

What is Clinical Pathology?

- **Covers most laboratory medicine, from routine tests like glucose and sodium to molecular tests for cancer markers and genome sequencing.**
- **Laboratory Experience:**
 - Involves spending time in the laboratory learning about how lab tests are run.
- **Encompasses numerous areas including:**
 - Blood bank, microbiology, hematology, chemistry, and molecular.
- **Key Topics:**
 - Quality control, proficiency testing, and laboratory management are essential.
- **Understanding specimen requirements, testing methodology, and interpretation of results is crucial.**
- **Physician Interaction:**
 - May answer questions from ordering physicians regarding test appropriateness or sample handling for certain tests.

Blood Bank and Transfusion Medicine:

- **Test blood type and antibodies to determine suitable blood products for patients in need.**
- **Identify antibodies, diagnose transfusion reactions, and assist in selecting appropriate blood products for transfusion.**
- **Includes apheresis procedures and therapeutic phlebotomy, typically supervised by pathologists with support from laboratory/nursing staff.**

Blood Bank/ Transfusion Medicine Rotation:

- May include stem cell collection and transplant, HLA typing and matching, and blood donation services.
- Transfusion medicine pathologists will often see patients including performing physical examinations and taking histories.
- You may learn:
 - How to perform a type and screen and transfusion reaction workup
 - Talk to clinicians about what blood products are indicated for their patients
 - Perform a plasmapheresis procedure on a patient with Thrombotic Thrombocytopenic Purpura (TTP)

Microbiology

- **Diagnosing Infections:** Utilize various laboratory testing methods to diagnose bacterial, viral, and fungal infections.
- **Hands-on experience for residents:**
 - Gain practical experience in:
 - 'Plating' specimens
 - Performing biochemical testing
 - Setting up tests for definitive organism identification and susceptibility testing
- **Organism Identification:** Learn to identify organisms based on various characteristics and tests.
- **Role of Molecular Testing:** Molecular testing is increasingly used for organism identification and detecting antibiotic resistance.
- **Collaboration:** Microbiology pathologists frequently consult and collaborate with hospital infectious disease doctors and epidemiologists.

Molecular Pathology

- **Classifying Disease based on macromolecules like RNA and DNA**
- **Practical Learning for Residents:** Gain skills in accessing molecular data, increasing data volume, and measuring targets from samples.
- **Clinical Applications:** Understand how laboratory tests can diagnose genetic mutations in tumors, infectious diseases (e.g., herpes simplex virus, human papillomavirus), or evaluate DNA variants contributing to disease.
- **Resident Training Includes:** Specimen selection, indications for testing, specimen setup, quality control, and result interpretation.

Hematopathology: A Unique Pathology Subspecialty

- **Combines Anatomic and Clinical Pathology:**
 - Perform and interpret bone marrow biopsies and lymph node analysis.
 - Expertise in hematology, flow cytometry, and coagulation sections of the laboratory.
- **Diverse Daily Tasks:** Start your day in the lab, performing CBC differentials, setting up specimens for flow cytometry, and diagnosing coagulopathies.
- **Collaborative Approach:**
 - Work closely with Hematologists and Oncologists
 - Utilize ancillary tests like immunohistochemical stains and cytogenetic/molecular tests for diagnoses.

Hematopathology: A Unique Pathology Subspecialty- continued

- **Varied Patient Population:** Encounter patients of all ages, from pediatric Acute Lymphoblastic Leukemia to elderly Chronic Myeloid Leukemia.
- **End-of-Day Activities:** Conclude by examining bone marrow biopsies and lymph nodes under the microscope.

Informatics

- **Spans all areas of pathology and medicine.**
- **Roots in Laboratory:**
 - Laboratory was an early adopter of informatics, with analyzers, interfaces, and middleware in place for years.
- **Applications in Pathology:**
 - Various applications include clinical decision support, whole slide imaging implementation, and machine learning-based image analysis algorithms.
- **Daily Activities:**
 - Attend meetings addressing Laboratory Information System (LIS) issues and solutions.
 - Collaborate with medical providers to optimize blood product ordering and delivery in the electronic health record (EHR).
 - Work with pathologists and researchers to train computers in recognizing cancerous areas in biopsies.
- **Impact:**
 - Pathology informatics initiatives impact healthcare workers and patients across the hospital.

Questions?

What's Next?

- 1. Join the CAP for FREE as a Medical Student Member**
- 2. Attend the CAP Annual Meeting to meet pathologists, residents, and other medical students interested in pathology**
- 3. Participate in the Resident Forum for insight on what pathology residency is like**
- 4. Tap into webinars and content created just for medical students.**





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