

# For Matt

- Dr. Benjamin J. Swanson, MD, PhD
- Associate Professor, Department of Pathology & Microbiology



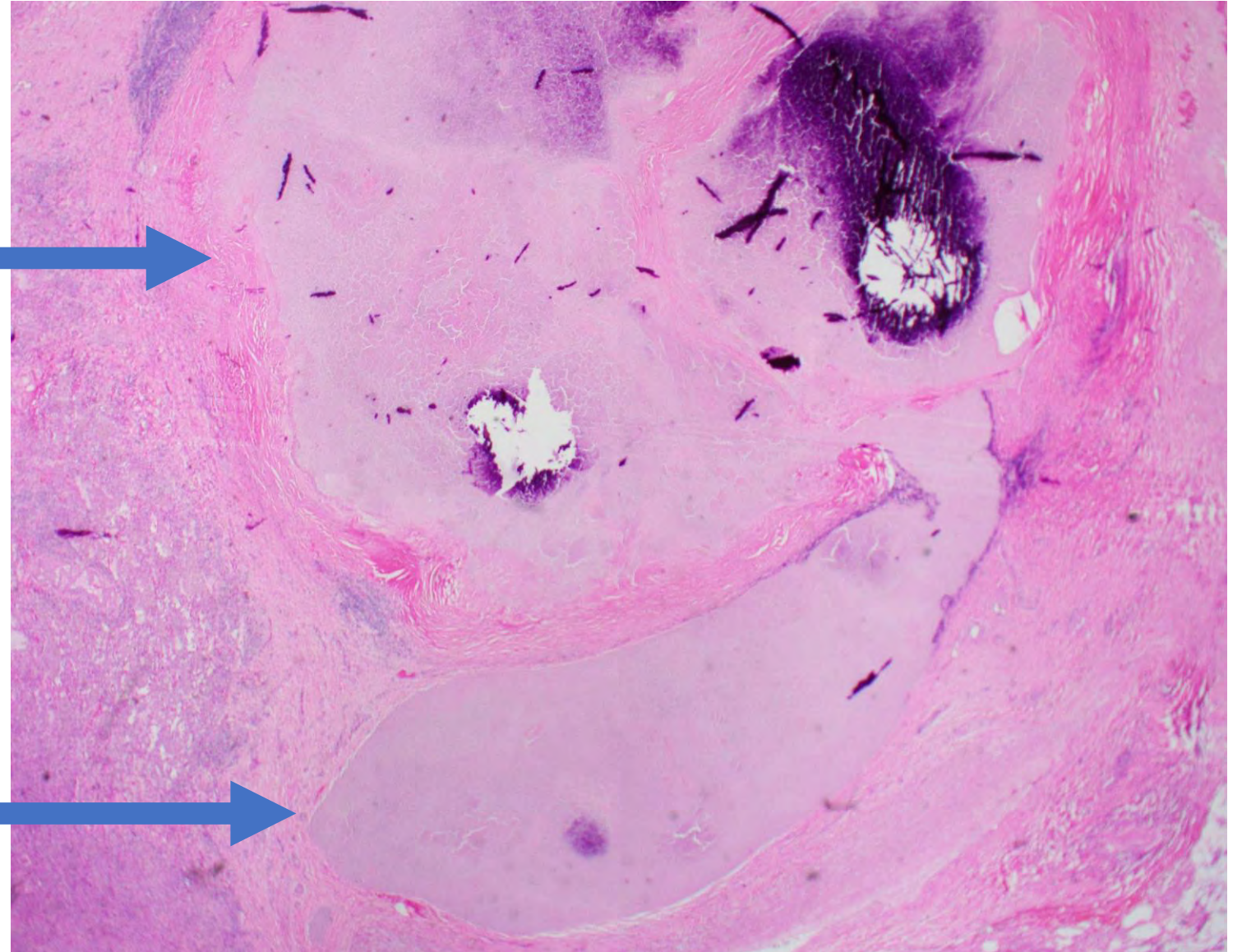
# For Matt

- Conflict of Interest (COI):
- Dr. Swanson serves on the Scientific Advisory Board for Cogen Bioscience
- Dr. Swanson also owns stock in Cogen Bioscience



# Topic 1: granulomas

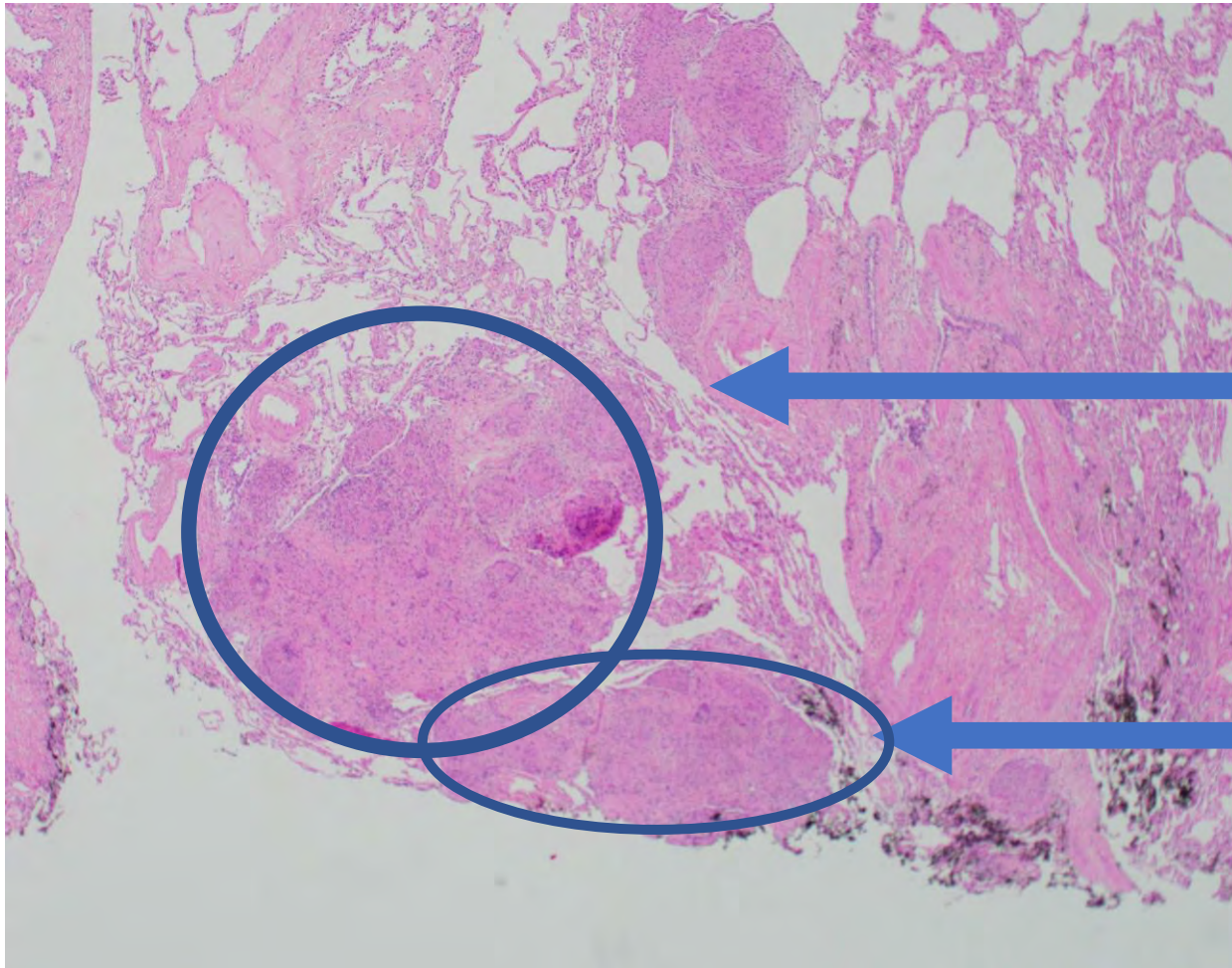
Necrotizing  
Granuloma



Satellite







Non-necrotizing  
granuloma

Satellite



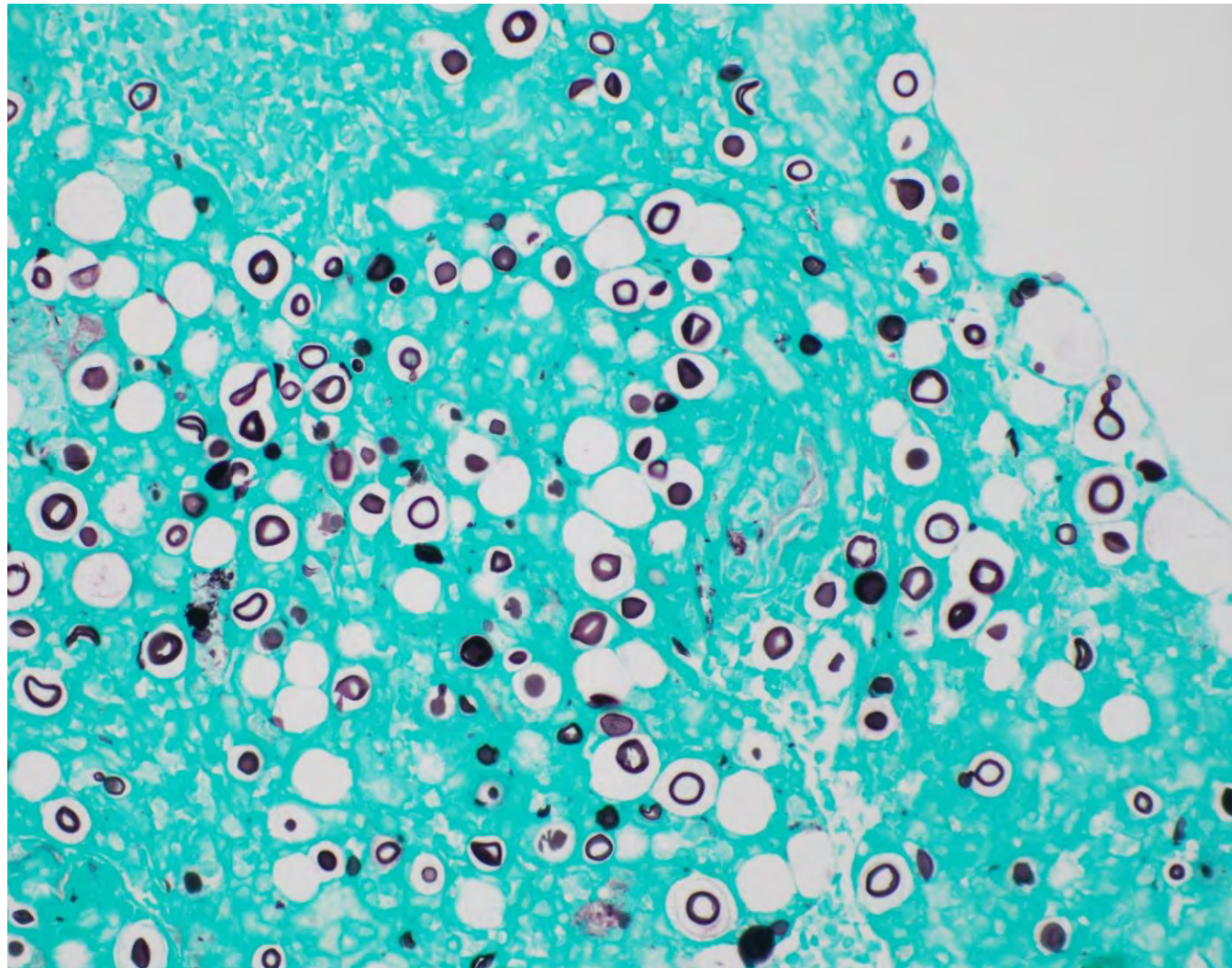
# Lung granuloma differential diagnosis

- Fungal infection####
- Mycobacterial infection
- Sarcoidosis





75yr old male with a 5 cm lung mass

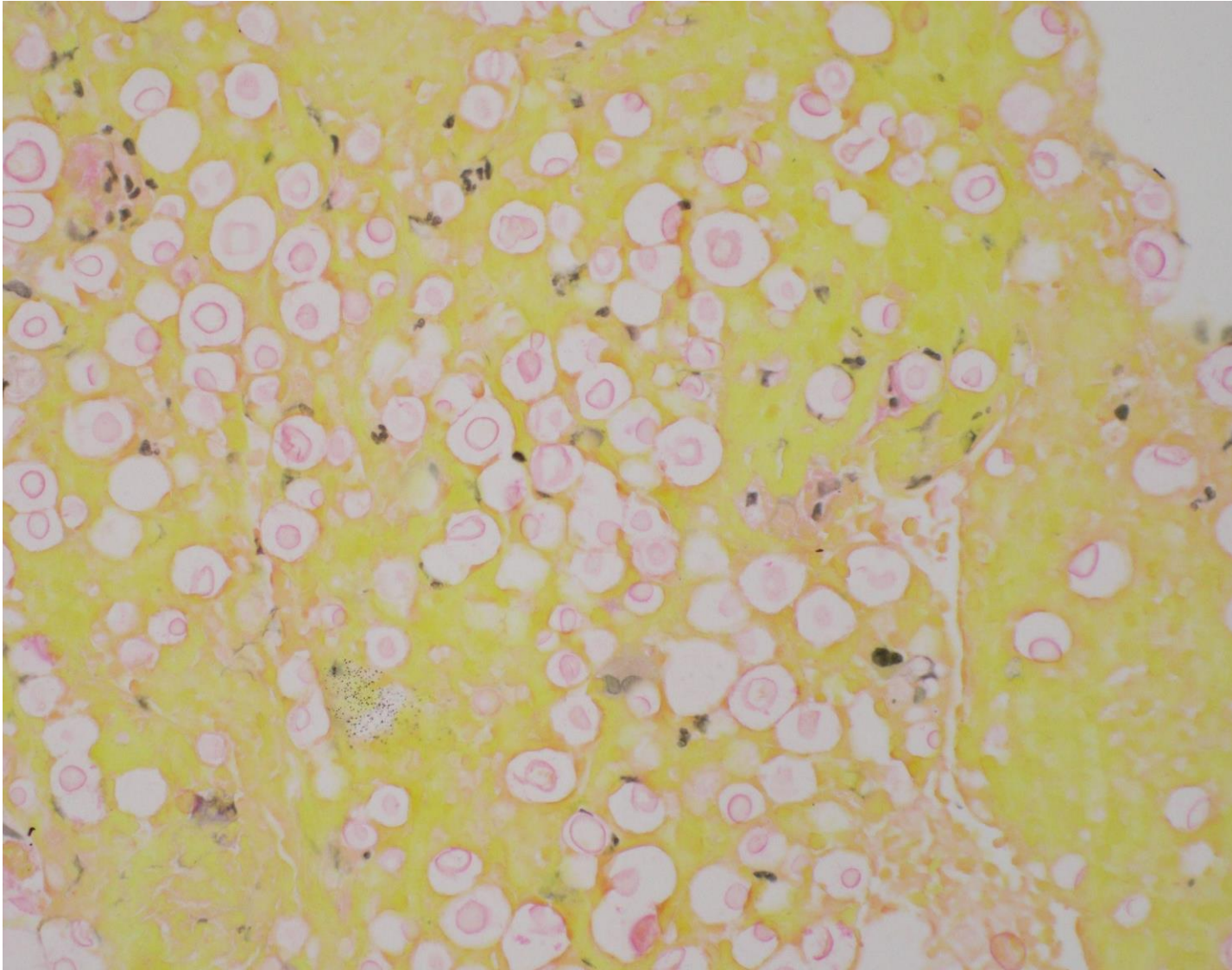


GMS fungal stain





## Mucicarmine stain



Your Diagnosis:

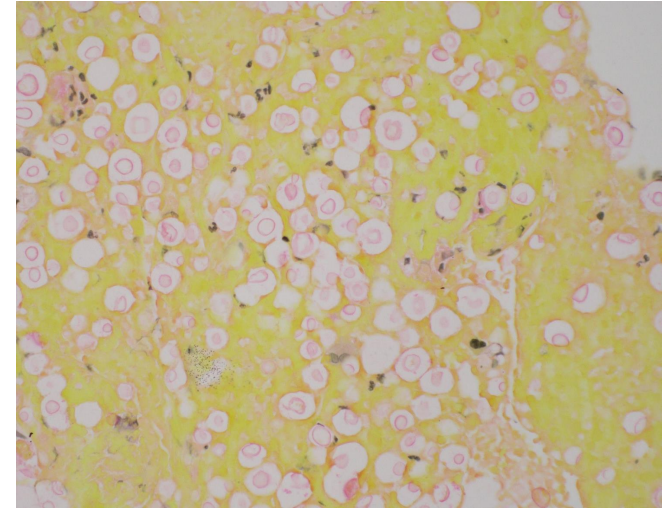
- A. *Histoplasma capsulatum*
- B. *Aspergillus fumigatus*
- C. *Candida glabrata*
- D. *Cryptococcus neoformans*





# Correct Answer

- *Cryptococcus neoformans*
- pleomorphic, round / oval yeast, 4 - 10 microns
- Narrow-based Budding yeast present
- Have a thick mucinous capsule → mucicarmine positive\*\*\*
- DDX: histoplasmosis, pneumocystis, blastomycosis



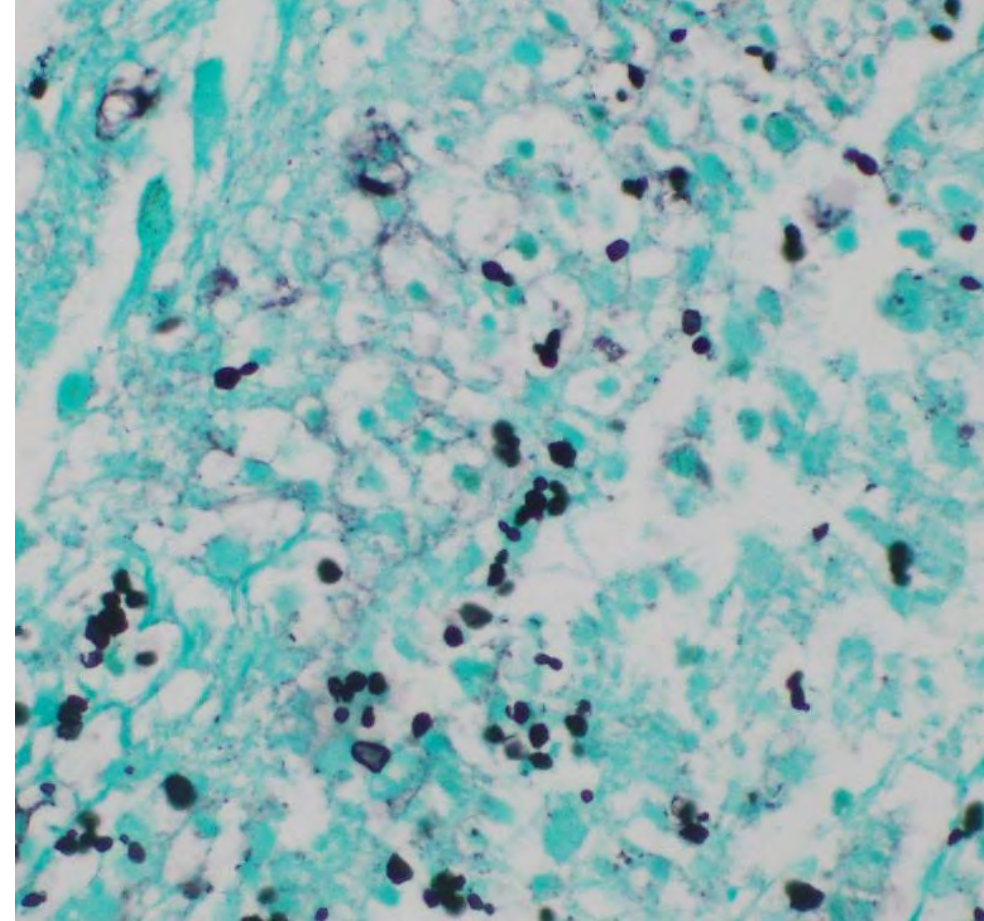
# Common lung fungi

- Histoplasmosis
- Pneumocystis jirovecii
- Aspergillus
- Cryptococcus neoformans
- Candida galbrata



# Histoplasmosis

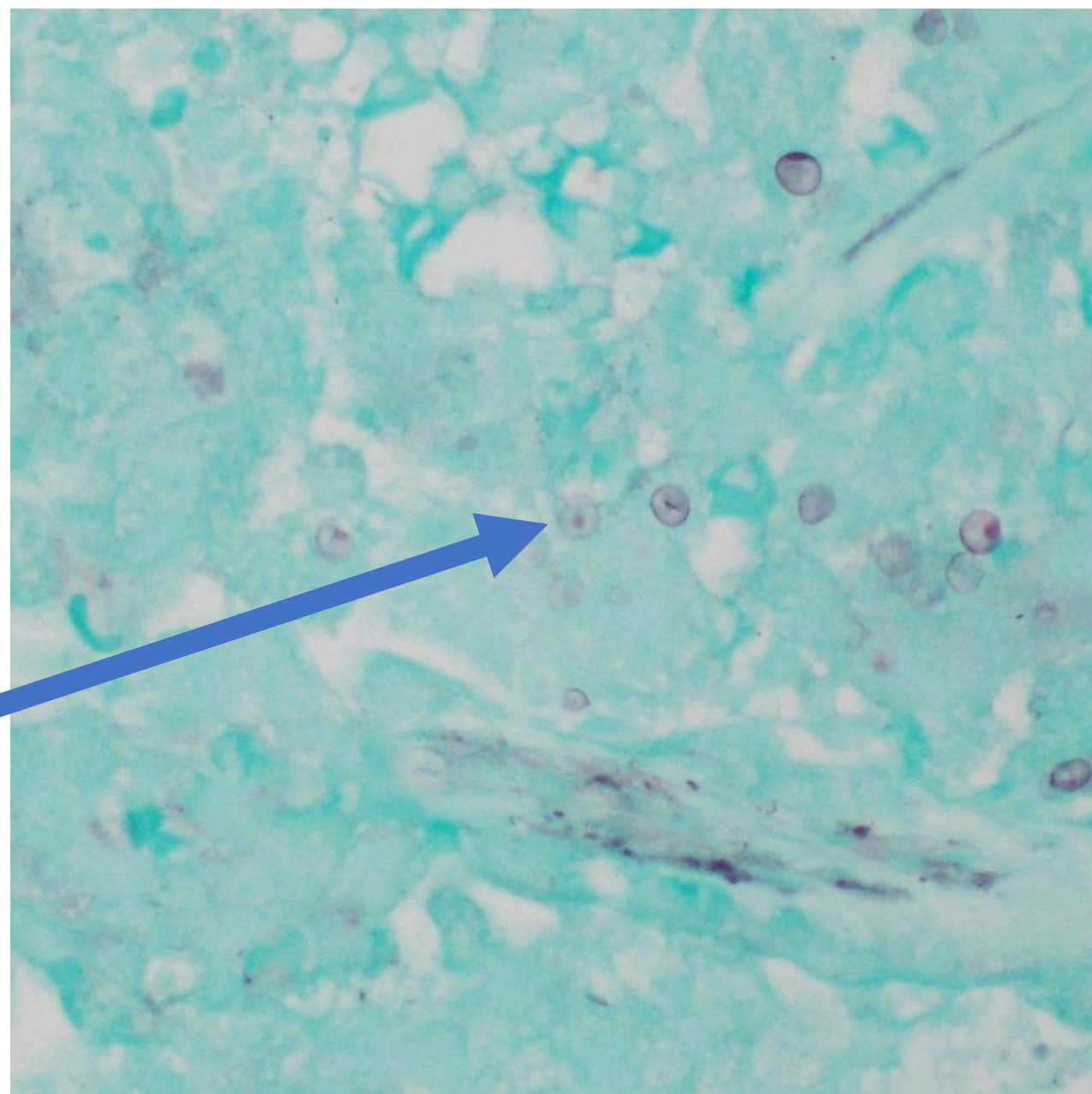
- The most common fungus seen in the lung
- Primarily see yeast (budding)
- Small regular forms seen
- Can be confirmed by urine antigen test
- Found in the Ohio, Missouri and Mississippi river valleys





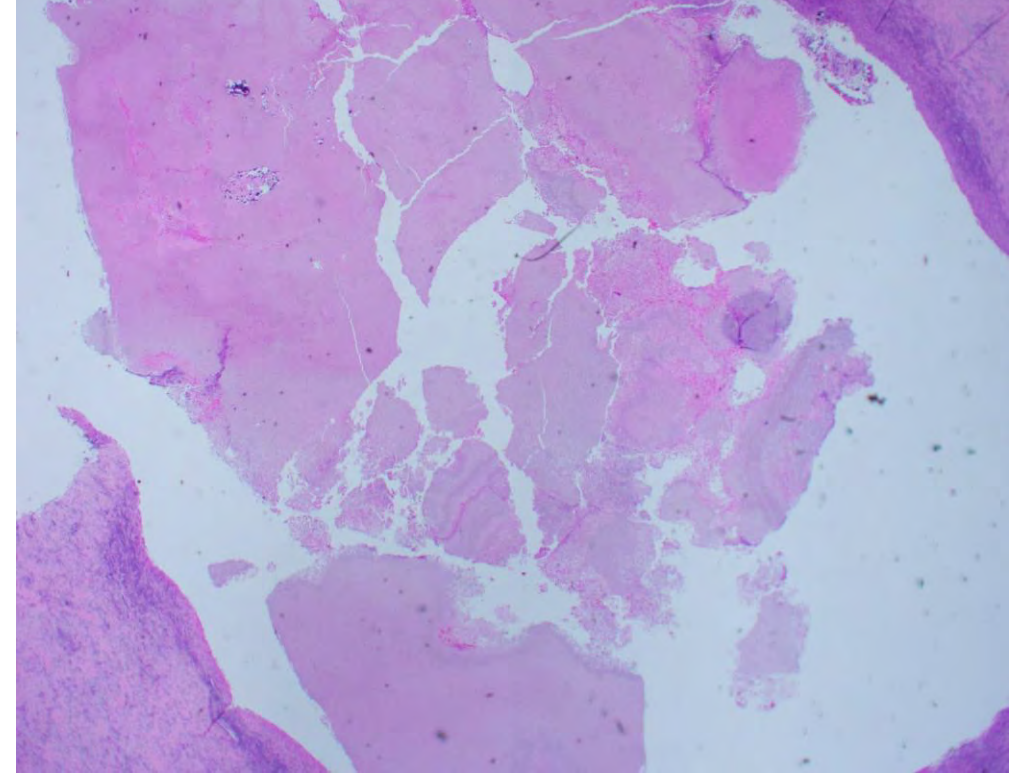
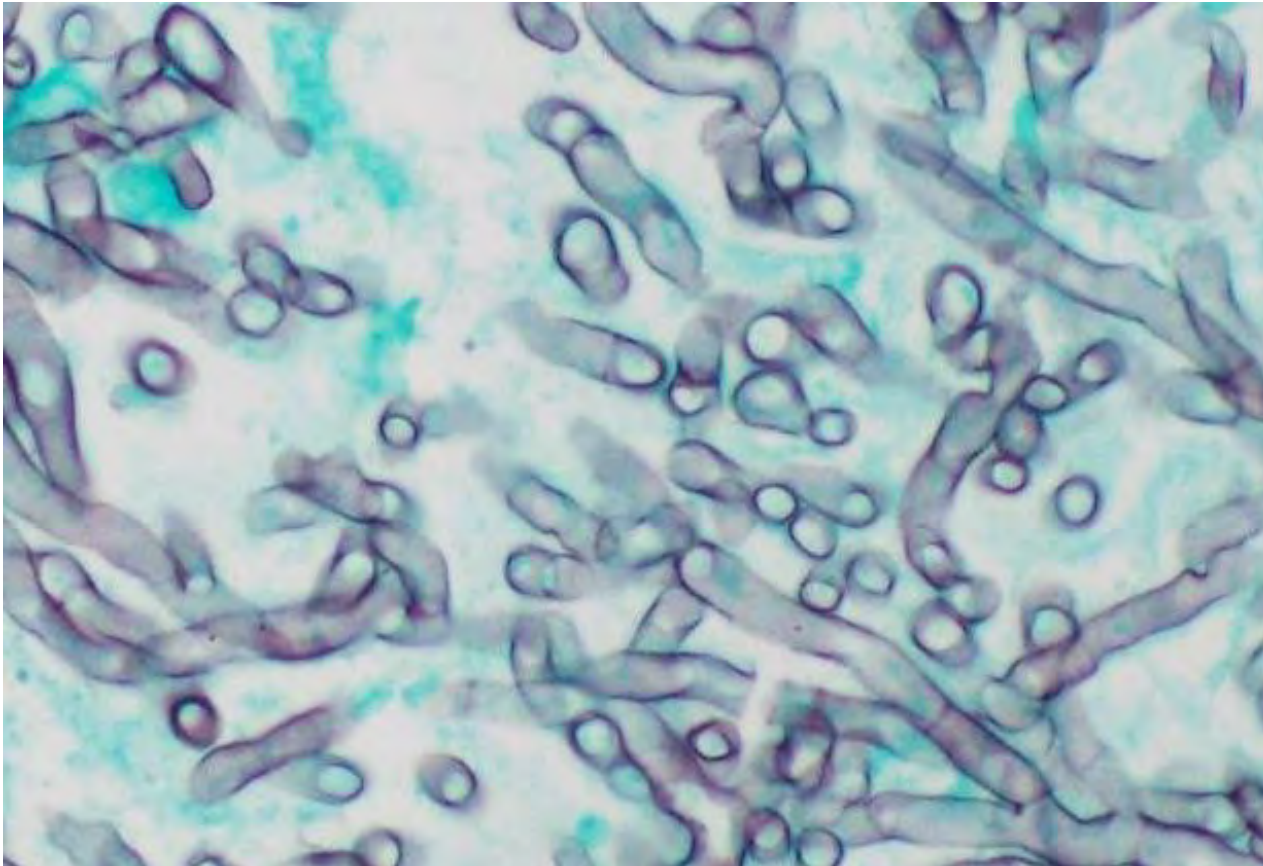
# Pneumocystis jirovecii

- Usually found in severely immunocompromised patients
- Alveolar spaces filled with pink, foamy amorphous material composed of proliferating fungi and cell debris
- Fungi are 5-8 microns, cup / boat shaped cysts → ping pong ball\*\*\*
- Yeast forms do not bud



# Aspergillus

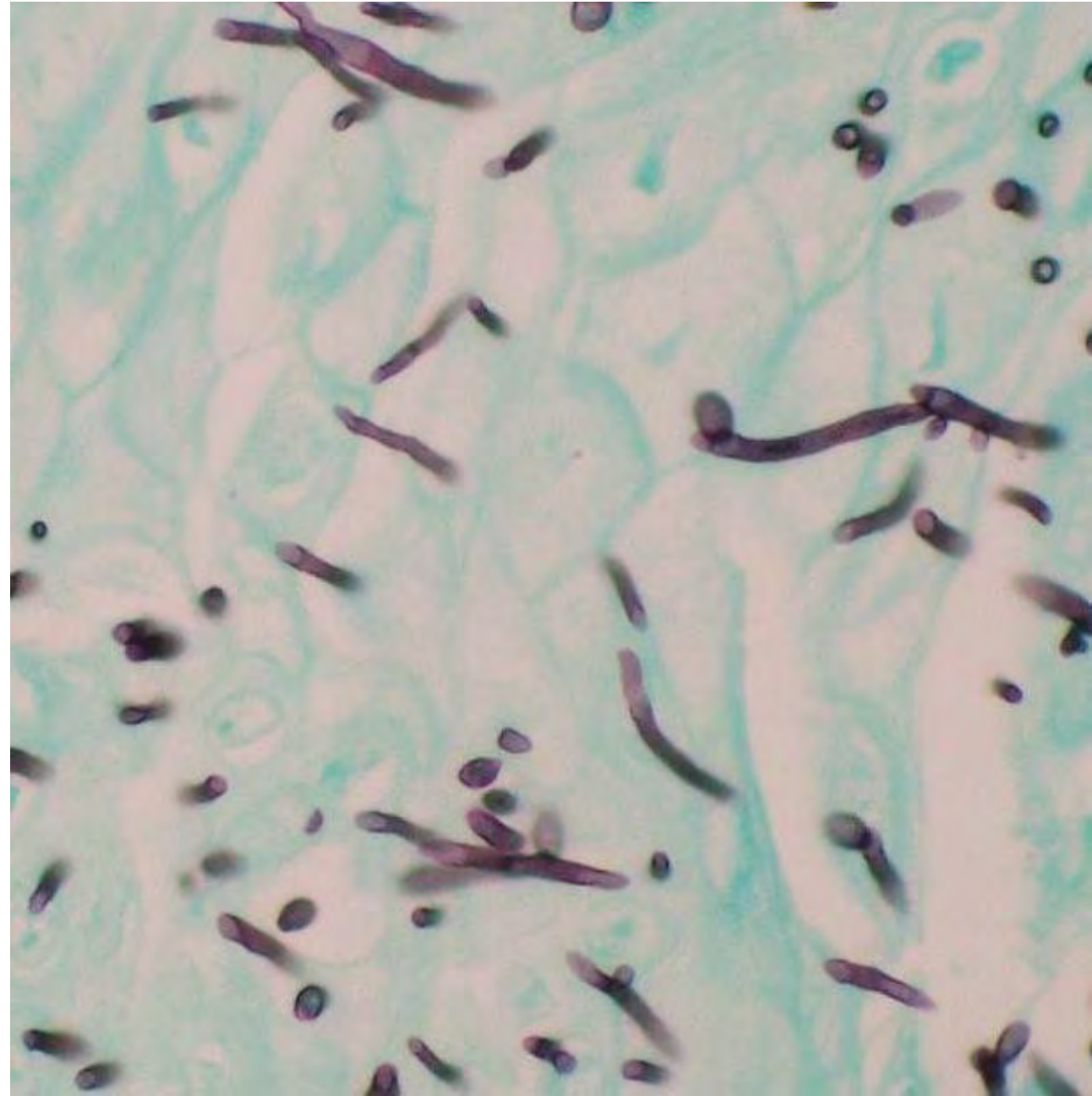
- Usually see fungal hyphae rather than yeast
- Branching at 45 degree angles
- Septations in the hyphae





# Candida glabrata

- Sometimes confused with Histoplasma
- Both yeast and pseudohyphae present





# Topic 2: Atelectasis

# Atelectasis

- Incomplete expansion of lung or collapse of previously inflated lung
- Can be primary or secondary (acquired)
- Effects:
  - V/Q mismatch
  - Infection
  - Fibrosis

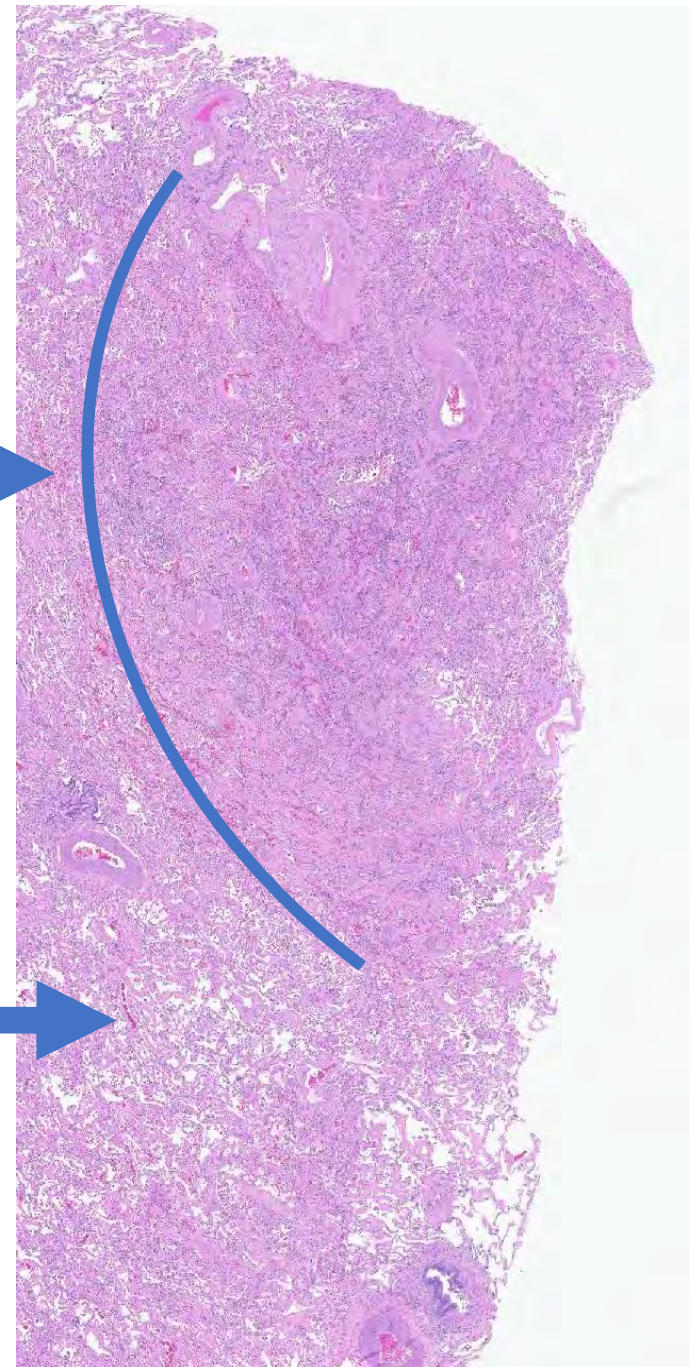


# Rounded atelectasis

Atelectasis



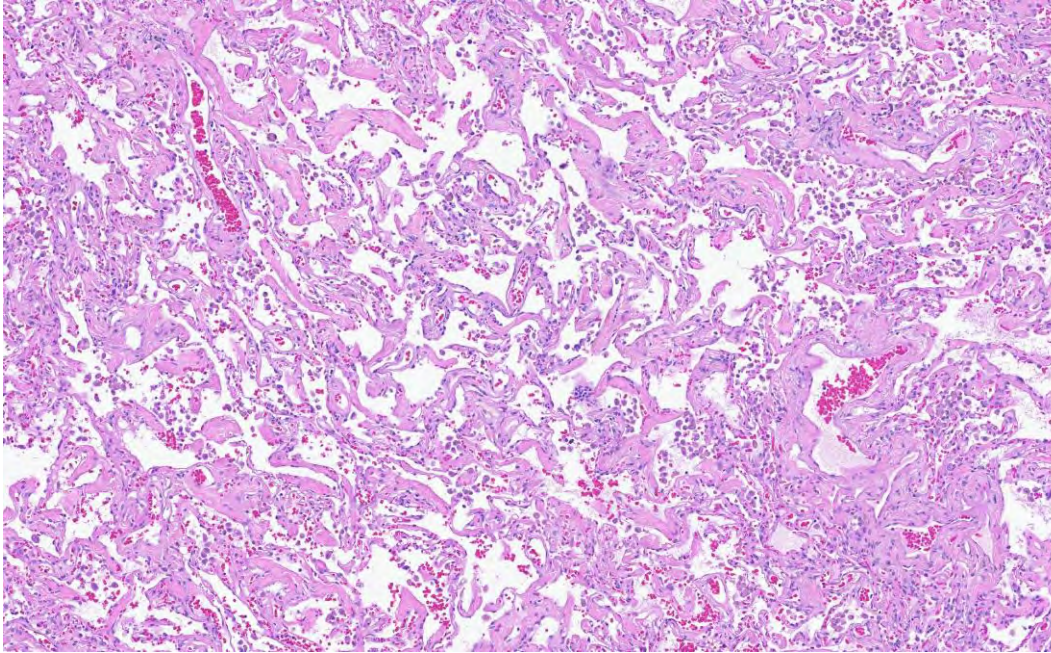
Aerated lung



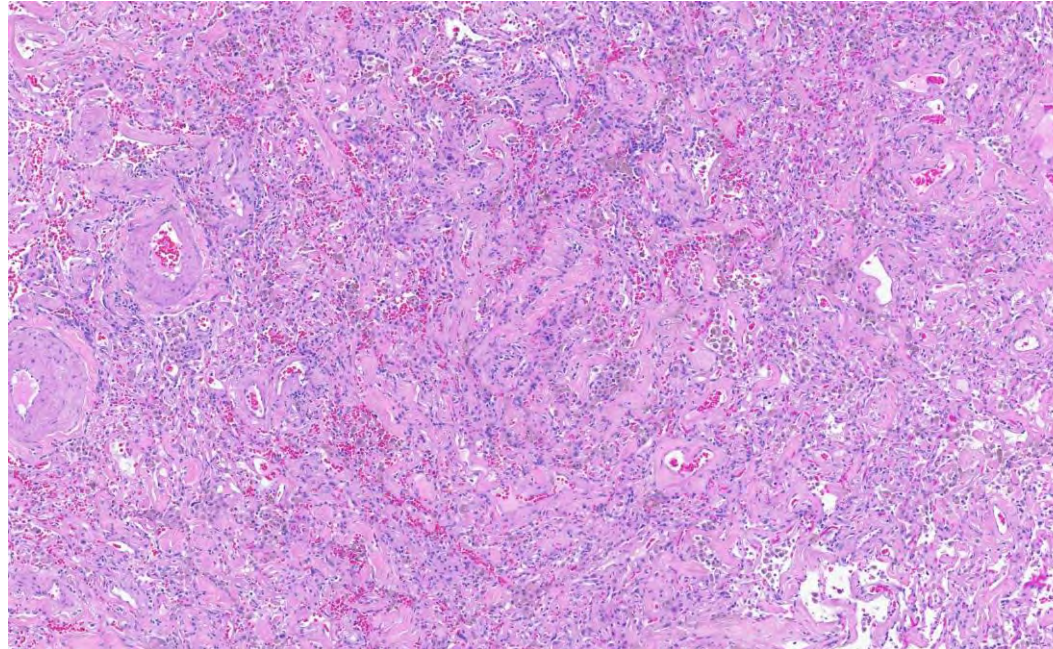


# Atelectasis

Normal aerated lung



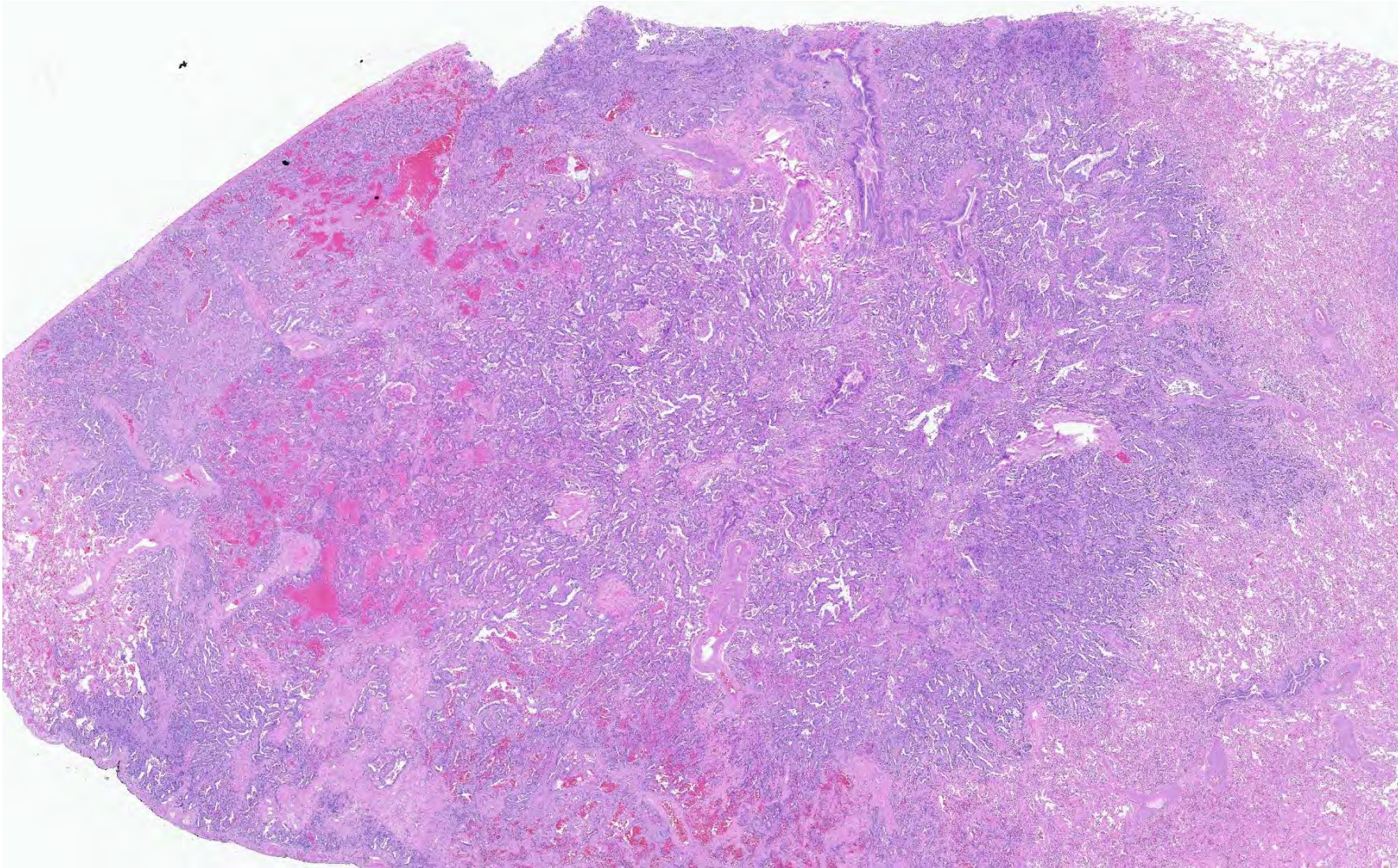
Airway collapse--> atelectasis



# Topic 4: Mucinous adenocarcinoma



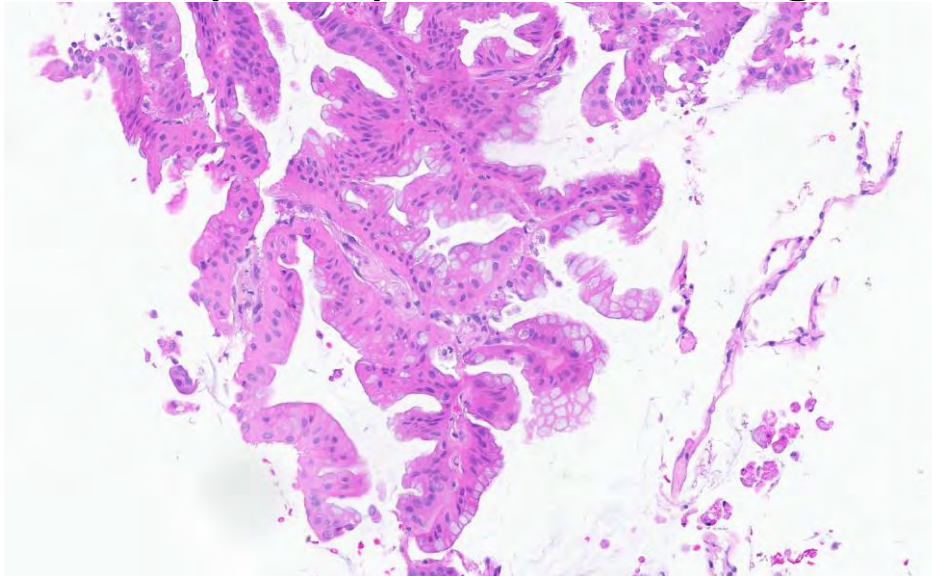
# Mucinous adenocarcinoma





# Mucinous Adenocarcinoma

- Formerly called mucinous bronchoalveolar carcinoma (not recommended terminology/obsolete)
- Must be distinguished by immunohistochemistry/clinical history from a metastasis from the pancreaticobiliary system, GI tract or ovary
- Usually show lepidic predominant growth, but can have other growth patterns

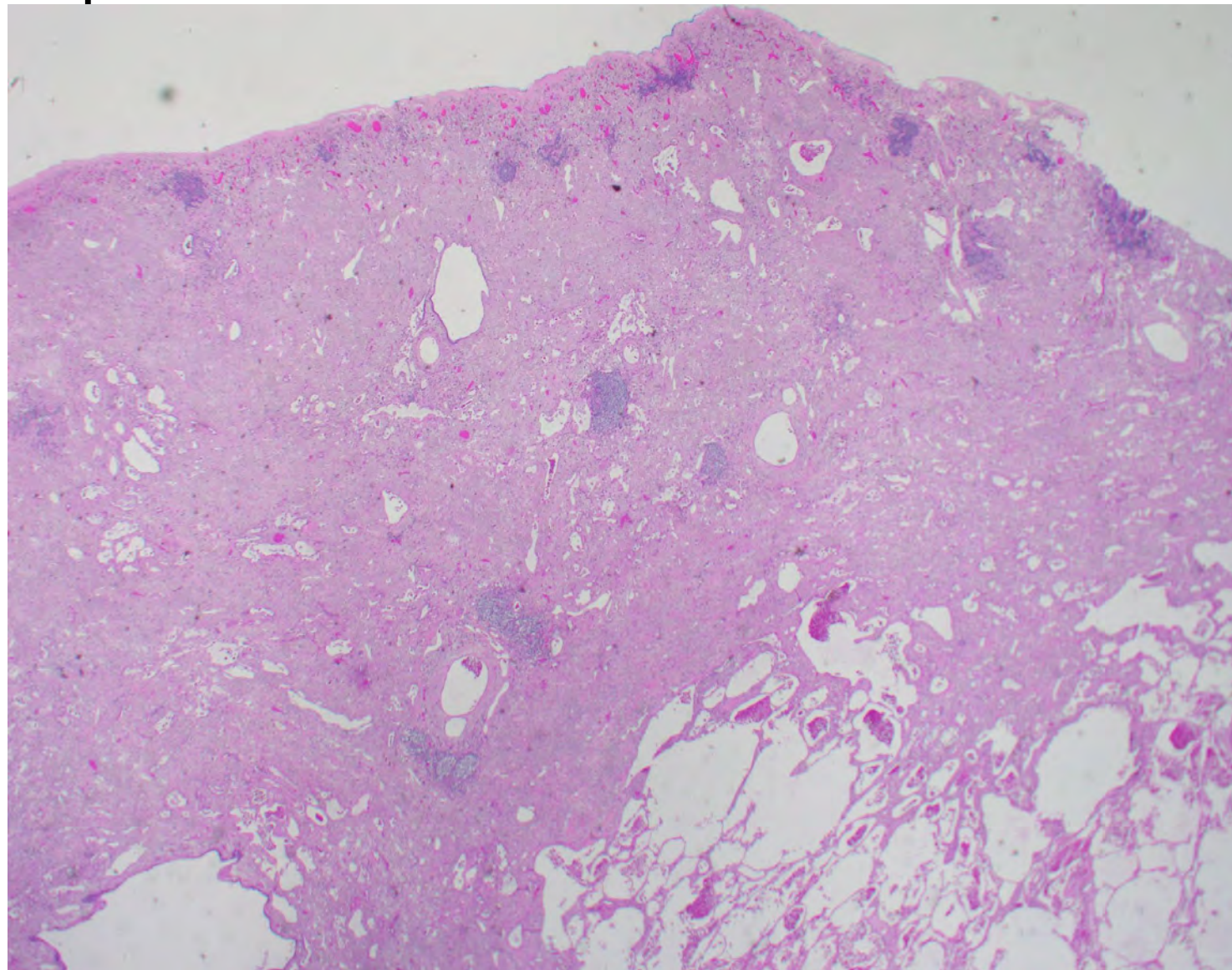




# Topic 5: Apical Cap

Use H&E slides from S22-54538

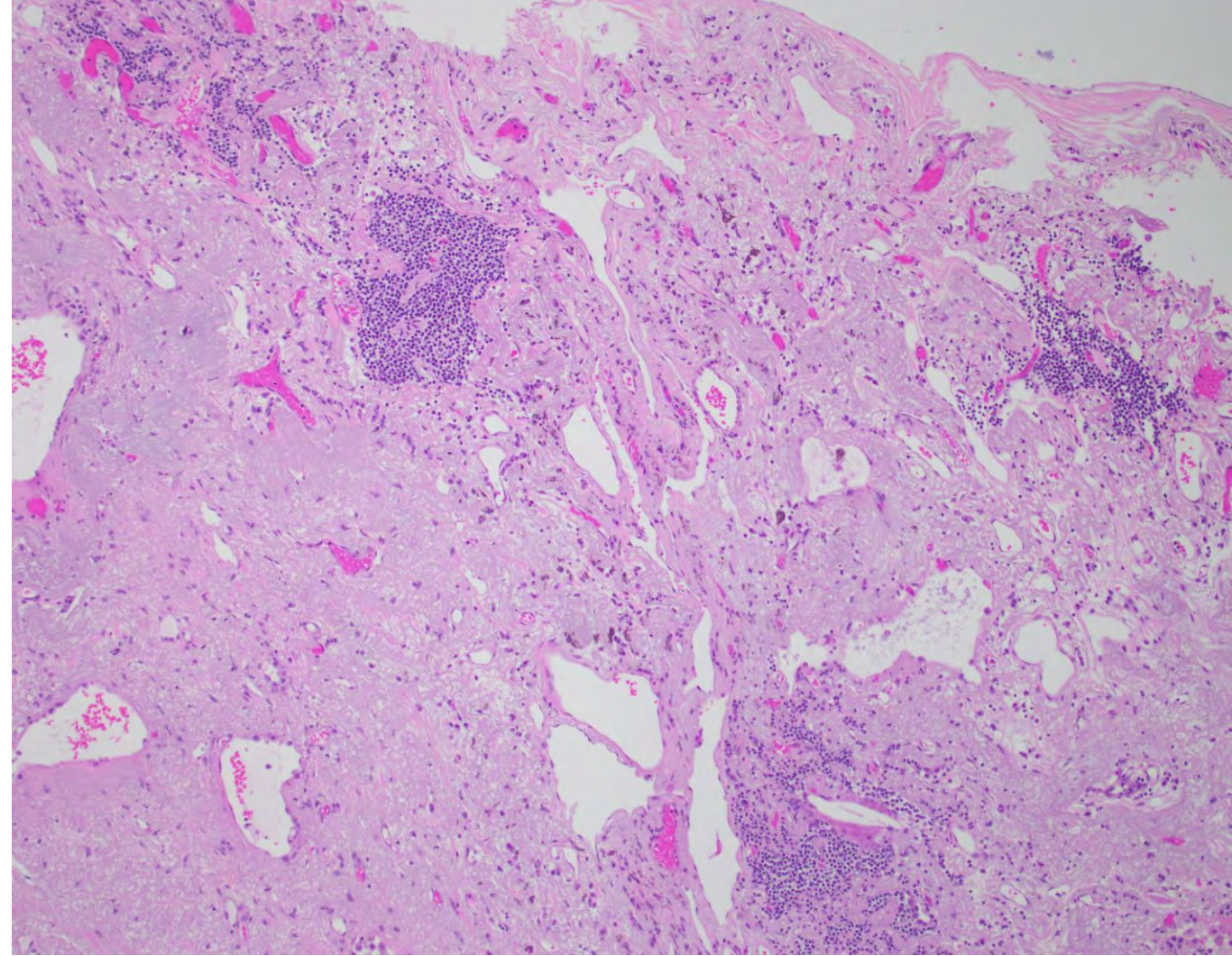
# Apical Cap





# Apical Cap

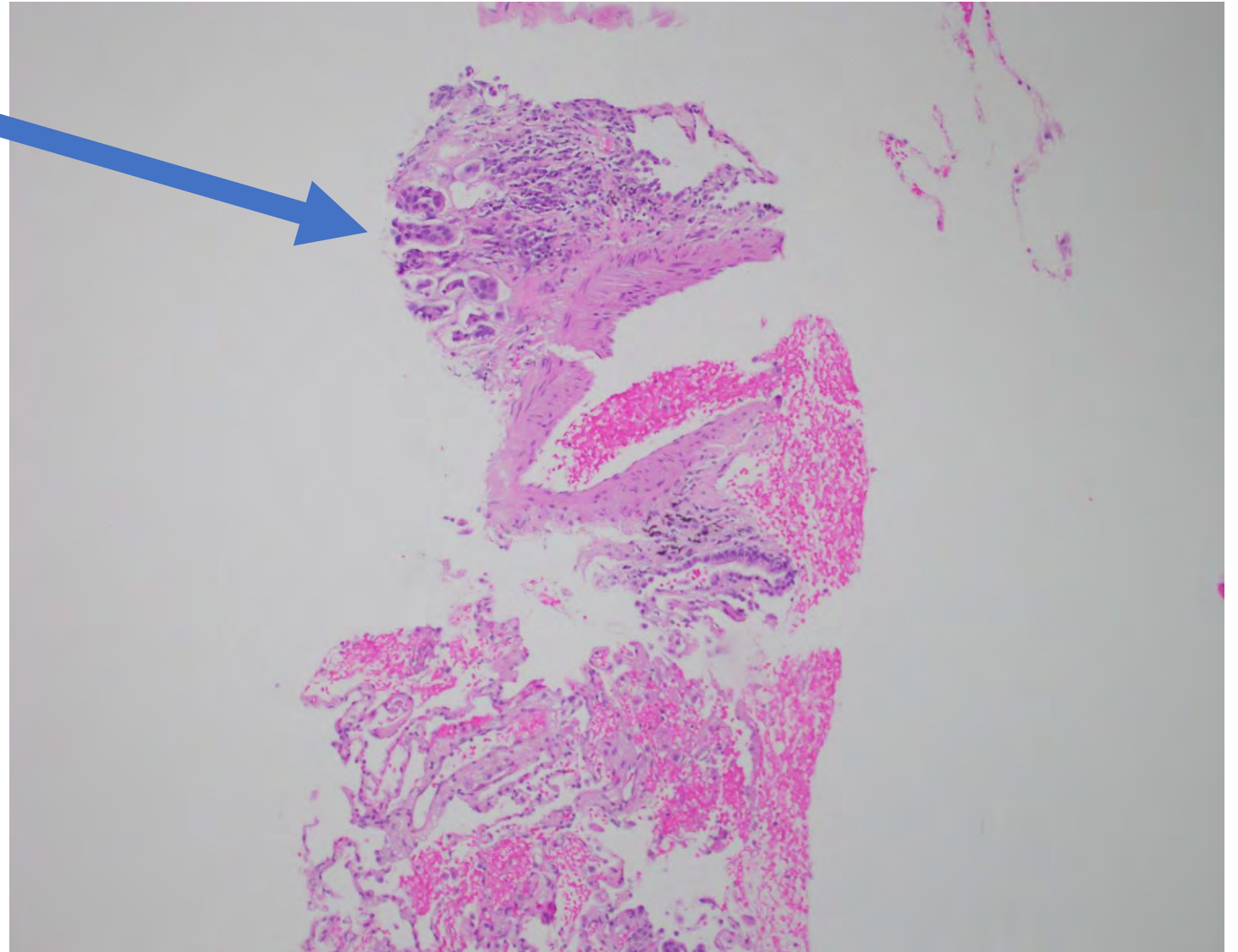
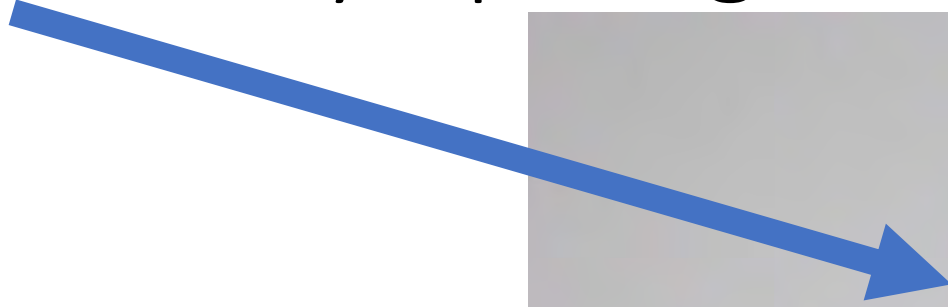
- Found at the apex (sub-pleurally) of upper lung poles
- Often see fibrosis, chronic inflammation, epithelial metaplasia and honeycombing
- Ischemic alteration??
- Rarely also see in upper regions of lower lobes of lung



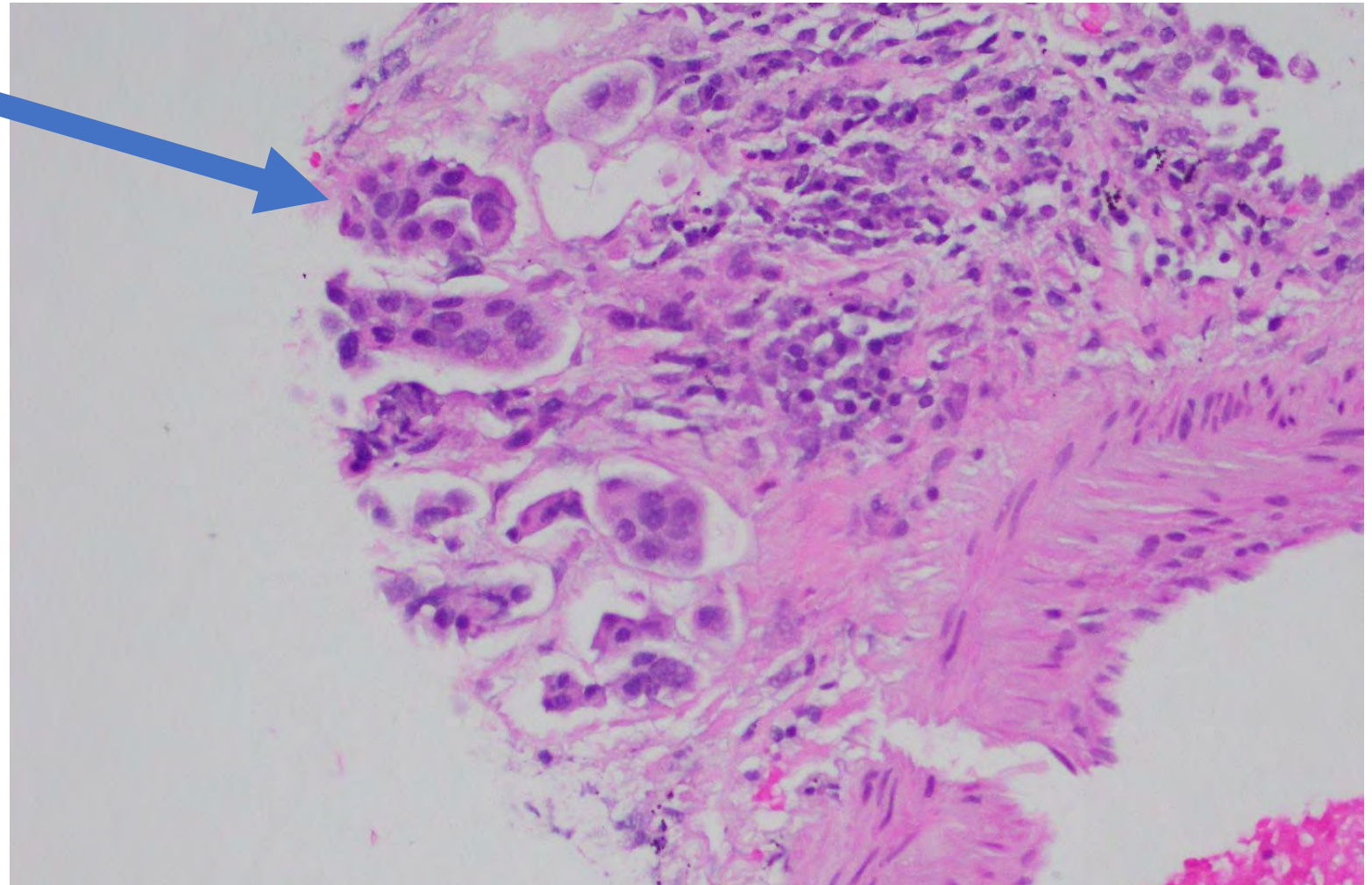


# Topic 6: Lymphangitic spread

# Low power lymphangitic spread



# High power lymphangitic spread

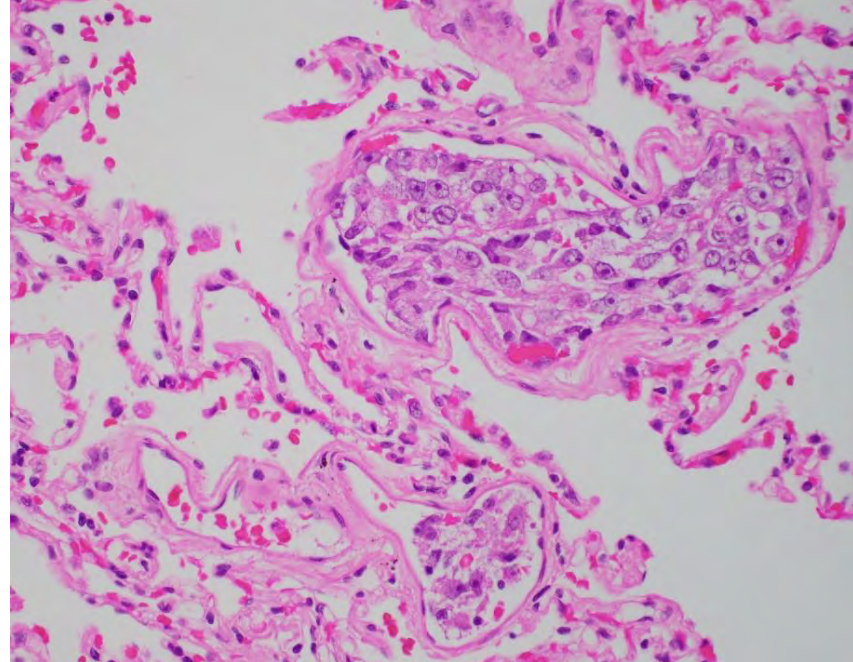




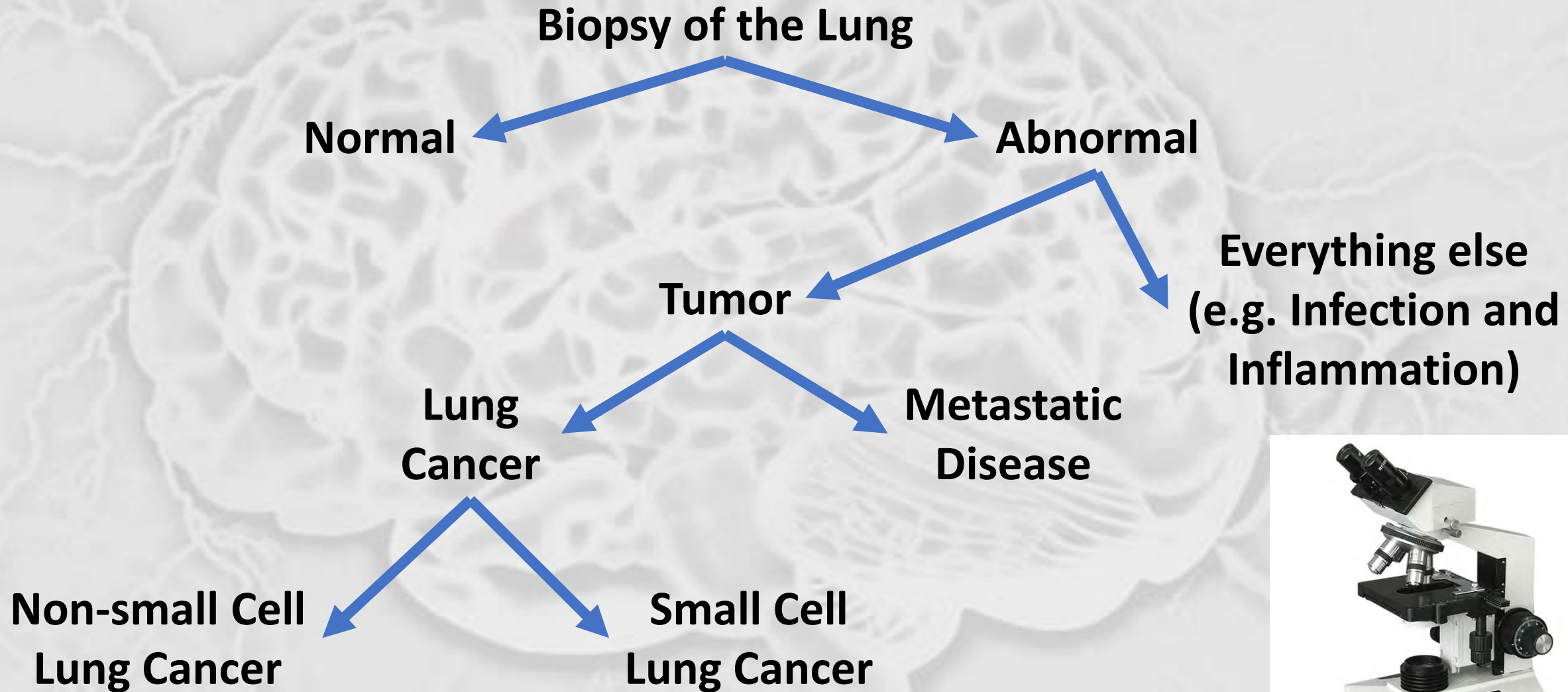
# Metastatic Tumors

## Patterns

- Multiple peripheral nodules
- Bronchioalveolar pattern
- Lymphangitic pattern



# In the Mind of a Pathologist



# Metastatic Cancer to the Lung

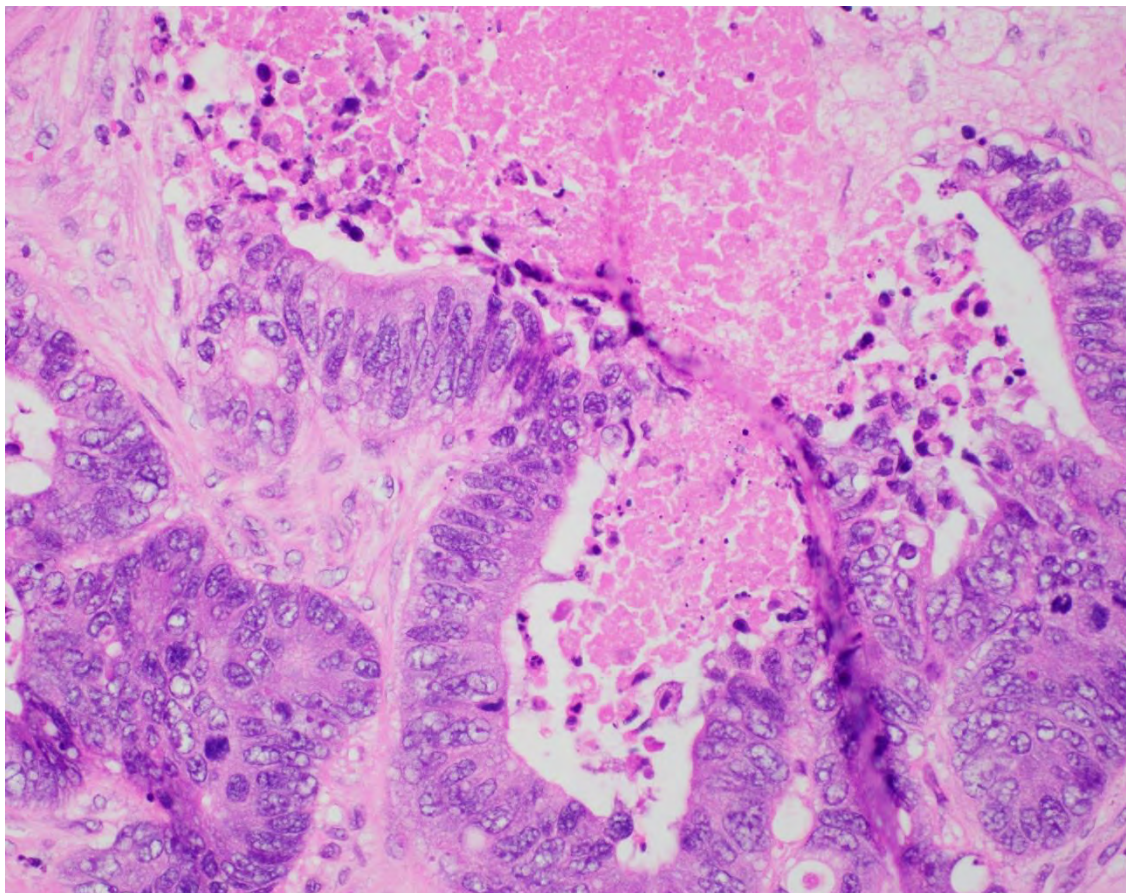
- Adenocarcinoma:
  - Colon Cancer
  - Pancreatic Cancer
  - Breast Cancer
- Squamous carcinoma:
  - Head and Neck
- Renal cell carcinoma
- Breast
- Melanoma
- Testicular
- Thyroid
- Sarcomas





# Colon Cancer

Often has central necrosis  
a.k.a. comedonecrosis

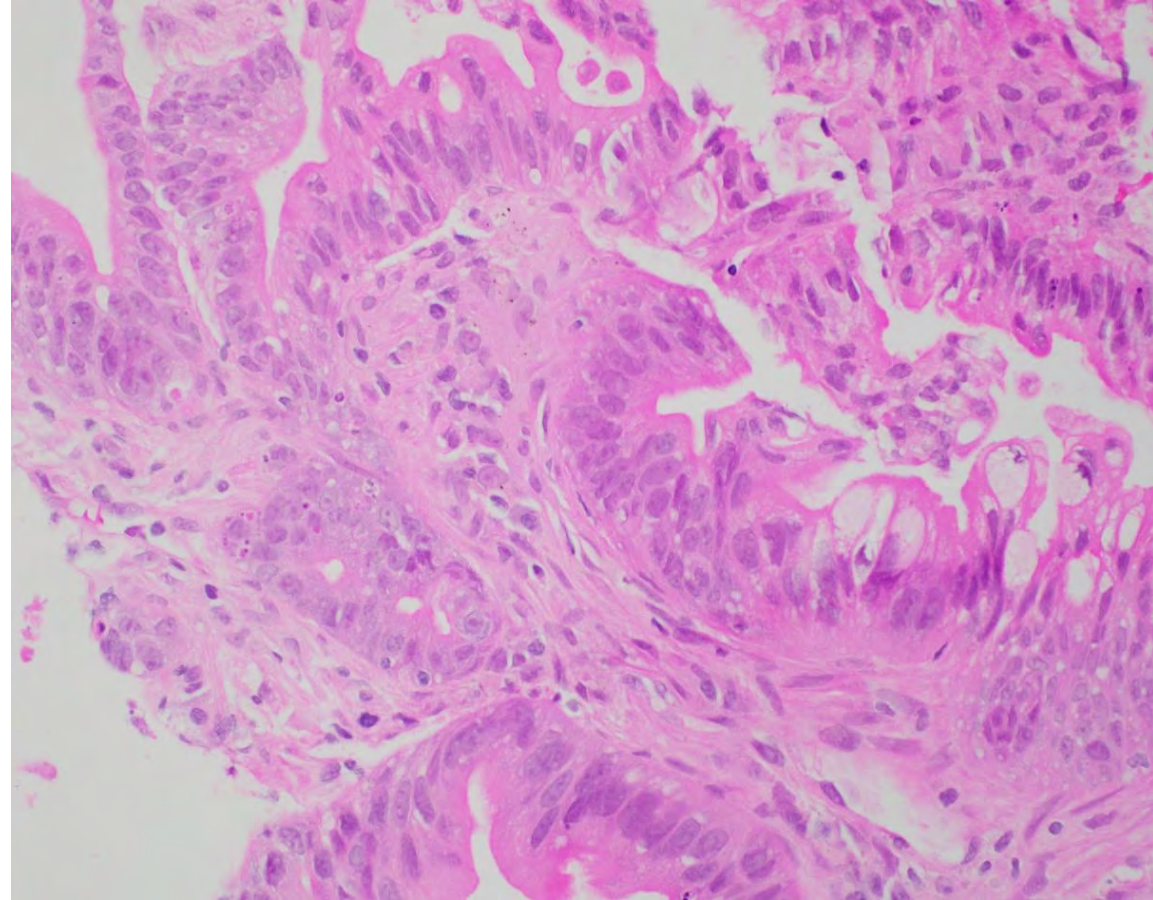


Colon cancer: CK20+, CDX-2 +, CK7 -, TTF-1 -  
Lung cancer: CK 20 -, CDX-2 -, CK7+, TTF-1 +



# Pancreatic Cancer

Looks like mucinous adenocarcinoma of the lung



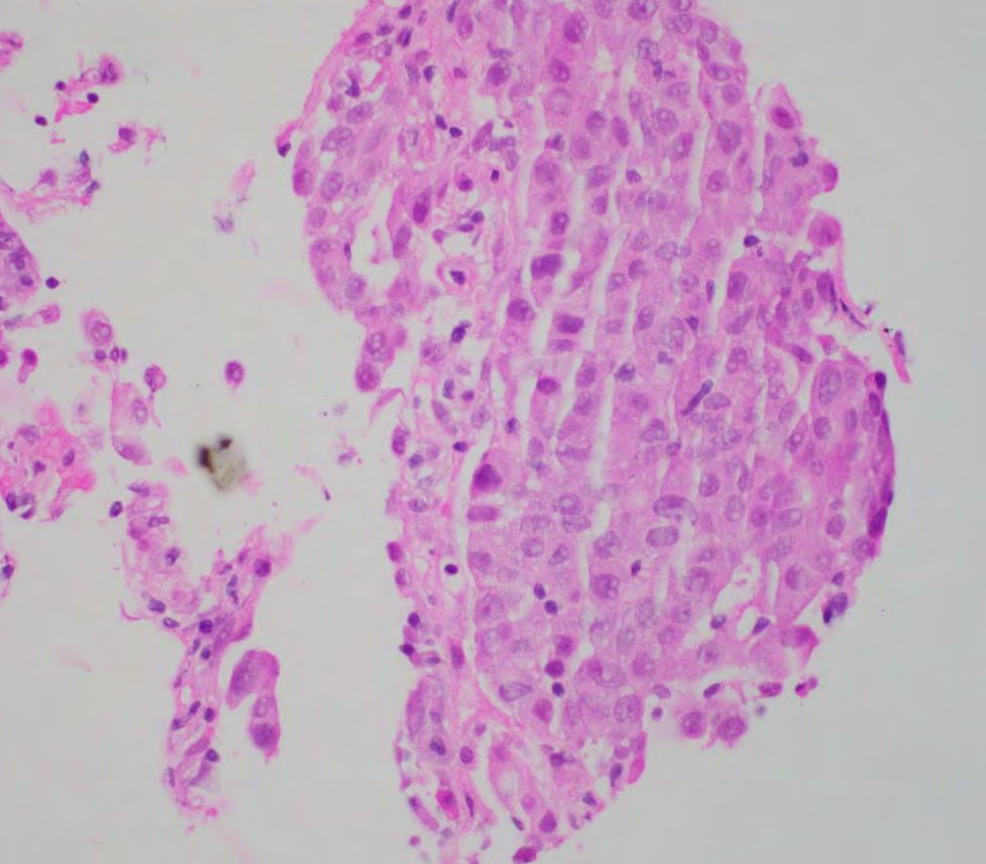
Pancreatic Cancer: CK7+, CK20+/-, CDX-2 +, TTF-1 -  
Lung Cancer: CK7+, CK20+/-, CDX-2 +, TTF-1+



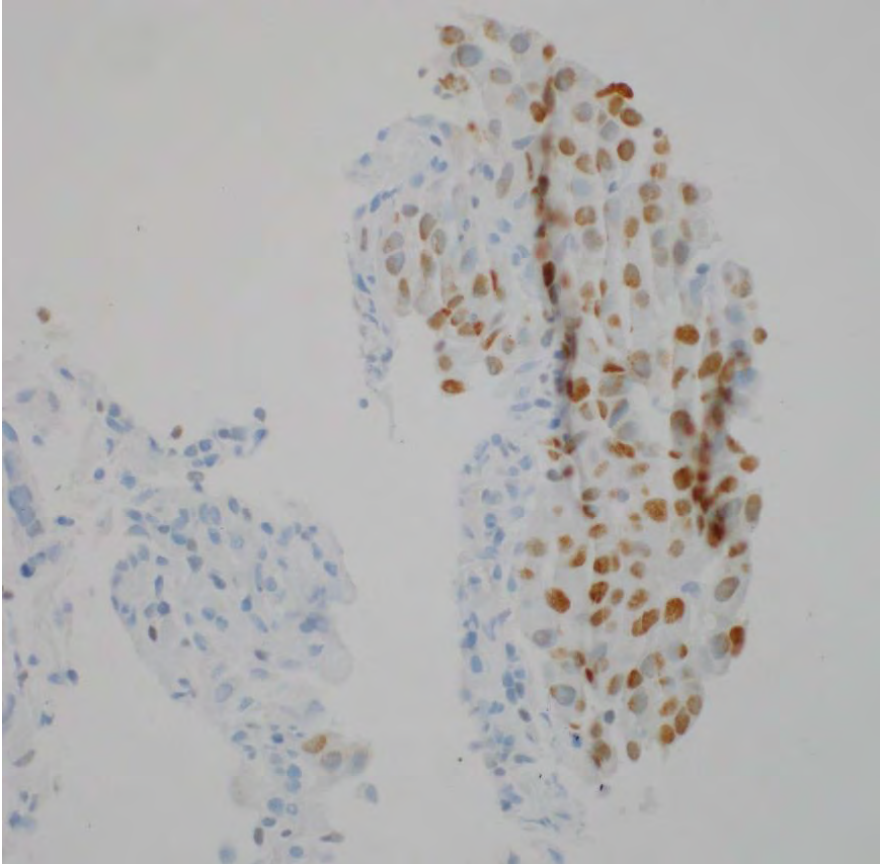


# Breast Cancer

H&E



GATA3



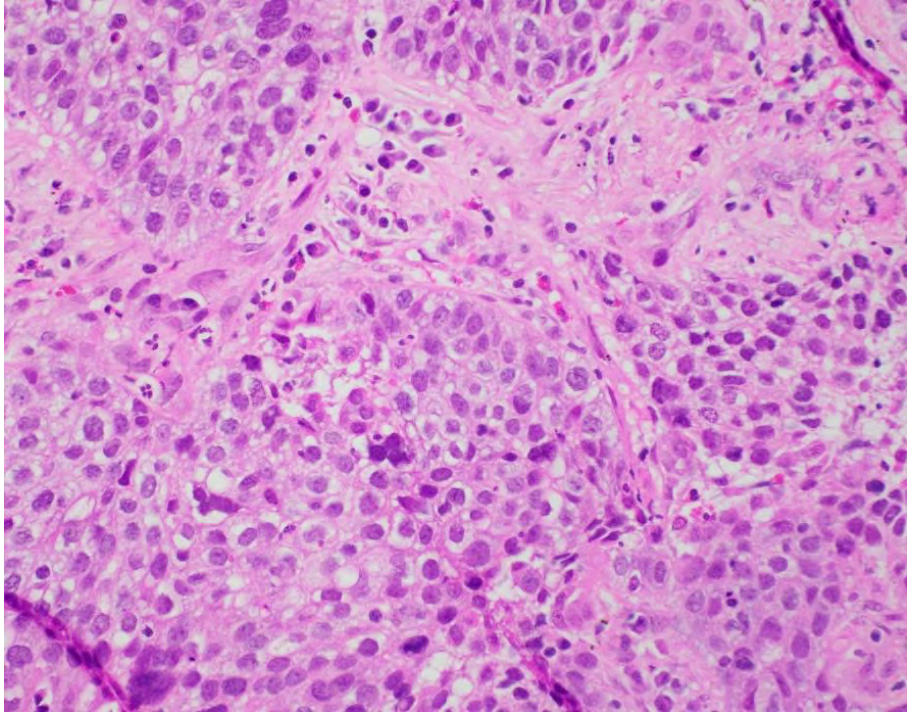
Breast Cancer: CK7+, TTF-1 -, GATA-3 +, often ER/PR +  
Lung Cancer: CK7+, TTF-1 +, GATA-3 -, ER/PR -



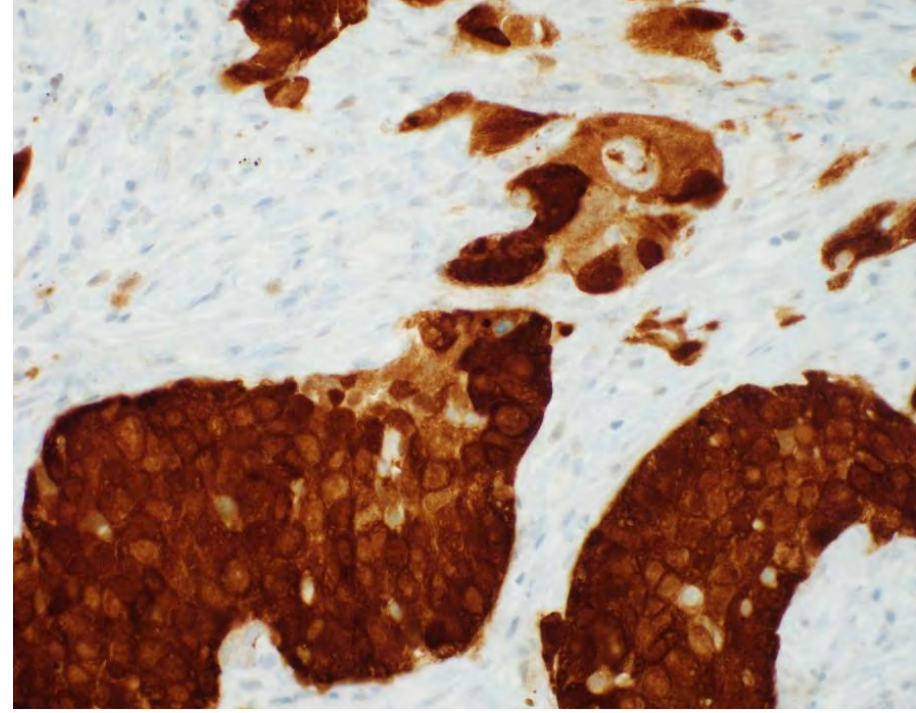


# Metastatic Squamous Cell Carcinoma

H&E



p16



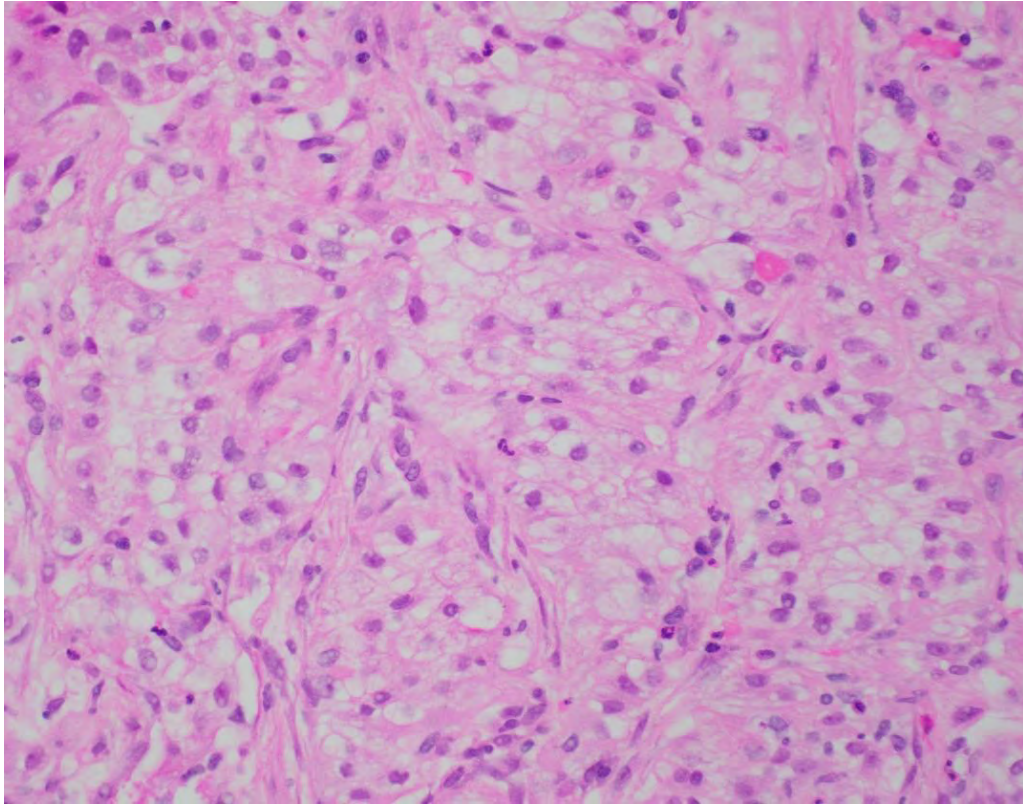
- Often from the Head and Neck
- Both lung primary and metastatic are p40+
- p16 is useful when tumor is HPV related



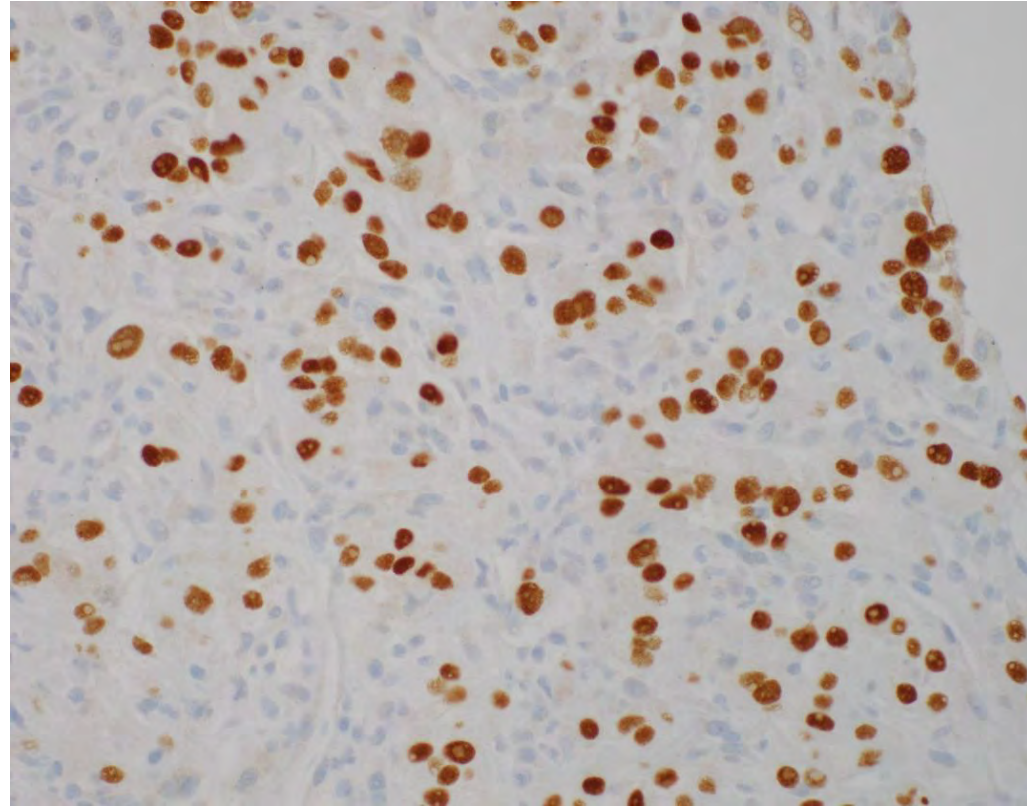


# Renal Cell Carcinoma

H&E



PAX8

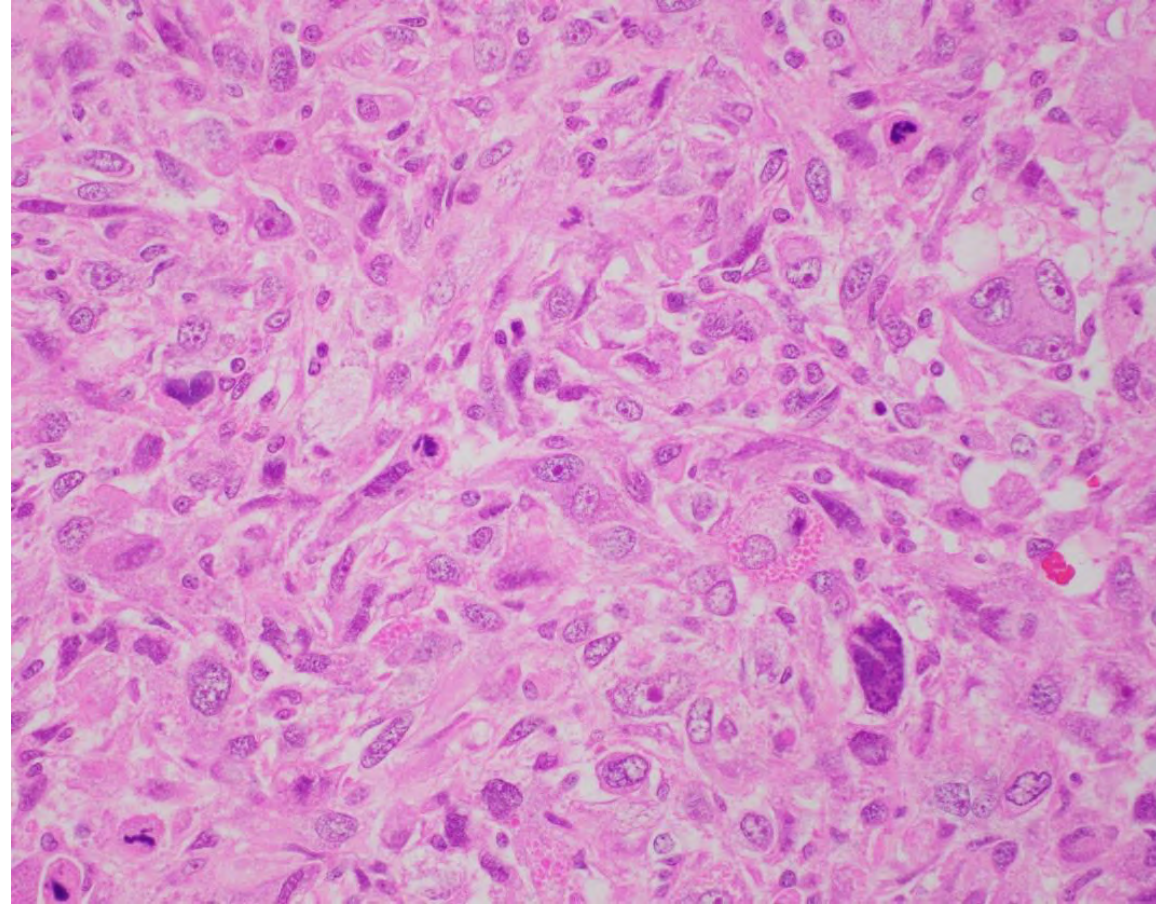


Renal cell carcinoma: CK7-, CK20-, PAX8+, CAIX +



# Melanoma

- Pigment-brown or black
- Epithelioid or Spindled cells



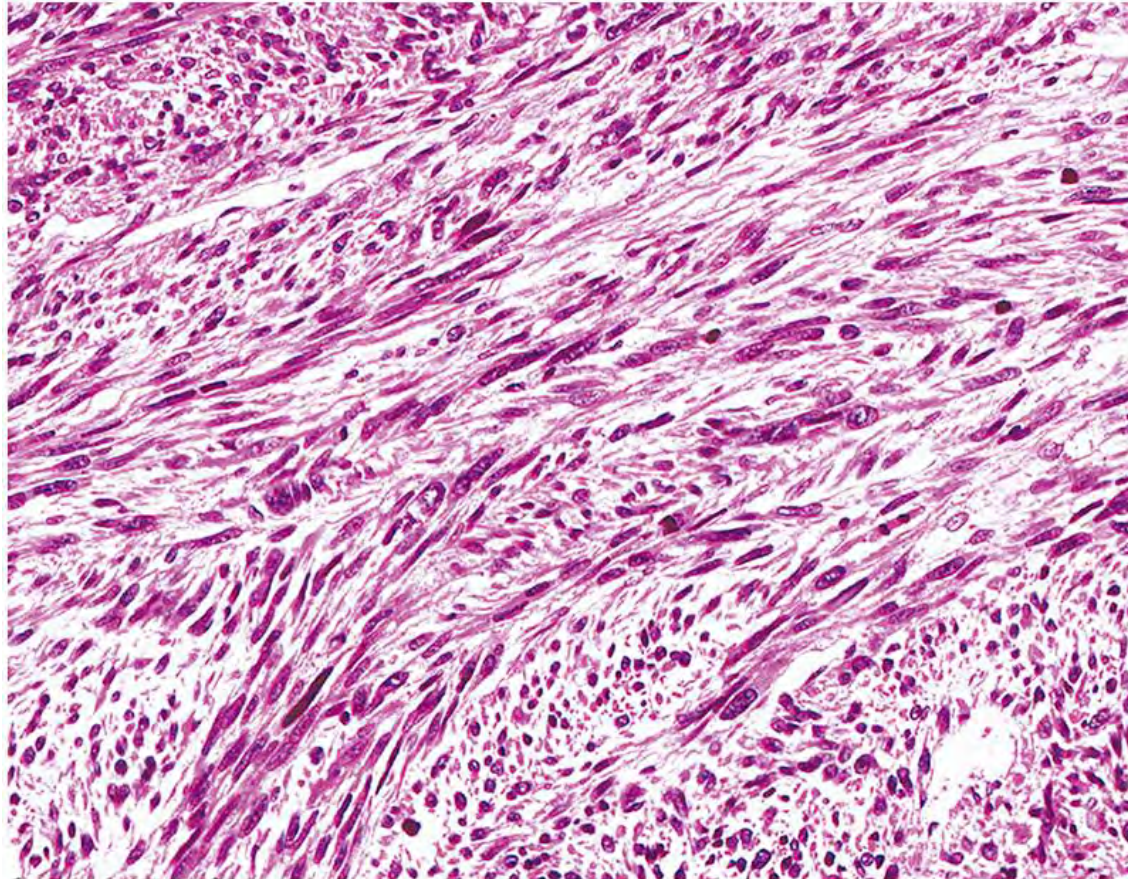
Melanoma: CK7-, TTF-1 -, p40-MelanA +, HMB-45 +, SOX10 +





# Sarcoma

- Usually have spindled morphology
- Common: osteosarcoma (from bone) and leiomyosarcoma (from smooth muscle cells)



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