PULMONARY PATHOLOGY

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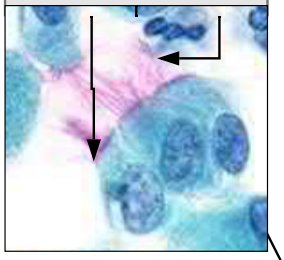
ROUND BLUE CELLS

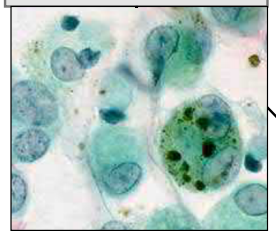
NORMAL

Respiratory lining with terminal bar + cilia

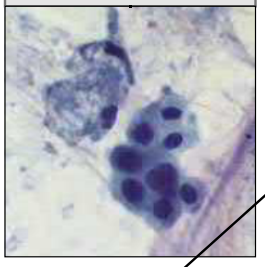


TIP: If you see cilia or the terminal bar means it is a BENIGN process! Reactive bronchial epithelium can look UGLY. Seeing cilia is a GOOD thing!

Anthracosis



Squamous Metaplasia



Mesothelial Cells

- *Sheet like, 2-D pattern*
- *Polygonal cells*
- *"Windows" between cells/ "Frilly skirt" due to microvilli*
- *Nuclear grooves*
- *Can make "Daisy cells" petals during menstruation*
- *POS:* **Calretinin, CK5/6, WT1**

FNA Contraindications:
COPD, Emphysema, Bleeding diatheses, Uncooperative patient, Severe pulmonary HTN, AVM, Suspected echinococcal cyst (hydatid dz)

Monotonous population
Scattered single cells
Req (fresh) sample for flow

LYMPHOMA

Nuclear molding & overlap, Necrosis, Mitoses, Absent or inconspicuous nucleoli

SMALL CELL CARCINOMA

CARCINOID (Well diff. NET)

LARGE CELL NEUROENDOCRINE

- *Requires resection for diagnosis*
- *Same feats as small cell CA, but more cytoplasm (larger cells), +/- rosettes*
- *DDx: Epithelioid angiosarcoma (CD34+, CD31+, CK-/+)*

NEUROENDOCRINE

- *"Salt & Pepper" chromatin*
- *Single cells & Clusters*
- *Can be spindled at lung periphery*
- *Neurosecretory granules on EM*
- *POS NE markers:* **, Chromo, Synapto, CD56, TTF1+**

NE markers
TTF1

NON-SMALL CELL CARCINOMA

TTF1+

Adenocarcinoma

- *Syncytial "drunk honeycomb"*
- *Forms glands & has mucin*
- *Periph nucleus w/ prom nuclolus*
- *NO terminal bars or cilia*
- *Lepidic (in-situ- grows along alveolar septae); Mucinous vs. Non-Mucinous*
- *POS:* **CK7, CEA, B72.3, BerEP4, MOC31, TTF1, Napsin CD15**

p40+

Squamous Cell Carcinoma (SCC)

- *Desmosomes; Discrete cell borders*
- *Dense cytoplasm +/- orangeophilia*
- *Tadpole cells*
- *POS:* **P40, P63, CK5/6**

p63+
TTF1+

Adeno- Squamous CA

- *Glandular + Squamous*

OTHER NEOPLASMS

Hamartoma

- *Peripheral location; well circumscribed*
- *Mix of fibromyxoid matrix, mature cartilage, bland spindle cells, fat*
- *Stromal epithelium + cartilage*

Adenoid Cystic Carcinoma (ACC)

- *Endobronchial location*
- *Cystic spaces; Cribriform*
- *DDx: Mucoepidermoid Carcinoma*

Melanoma

- *+/- Melanin pigment*
- *Prominent, cherry red nucleolus*

Metastases

- **COLON**: *Dirty necrosis, cigar shaped/columnar cells*
  - *CDX2+; CK7-; CK20+; SATB2+*
- **BREAST**: *Intracytoplasmic lumens/ "Targetoid" cells*
  - *Lobular (Single filing, mucin; E cadherin-)*
  - *ER+; PR+; GCDFP+, Mammaglobin+*
- **RENAL:** *Clear cytoplasm, chickenwire vasculature*
  - *PAX2+, CAIX+ (clear cell), CK7+ (papillary or chromophobe)*
- **PROSTATE:** *Prominent nucleolus*

PNEUMOCONIOSIS

Asbestos

- *Asbestos/Ferruginous body (iron)*
- *"dumbbell" shaped*
- *Can lead to bronchogenic carcinoma, pleural plaques, or mesothelioma*

ALVEOLAR & AIRWAY PROBLEMS

Plant Material

Geometric patterns, Indicates aspiration

Pulmonary Alveolar Proteinosis (PAP)

- *Defective macrophage*
- *Frothy, homeogeneous, dark, dense pink stuff in alveolar spaces*
- *PAS+ secretions*

Asthma (sometimes CF)

- *Creola bodies= reactive bronchial cells; "porcupines" with cilia completely surrounding the dense cell cluster*
- *Inspissated mucus*
- *Curshman's sprials= "caterpillars" (inspissated mucus)*
- *Charcot Leyden crystals (2/2 eosinophil degranulation)*

MOLECULAR TESTING

- **EGFR** = Tyrosin Kinase Inhibitor therapy (TKI)
- **MET Amplification** = Resistance to EGFR inhibitors
- **KRAS mutation** = worse prognosis, smokers
- **VEGF**
- **ERBB-2 (HER2)**
- **BRAF**
- **IGF-1R, PIK3CA**

- ***TKIs****= Crizotinib & Ceritinib*
- ***EGFR mutations***
  - *More common in **adenocarcinomas** with **lepidic** & **papillary** patterns*
  - *Somatic mutations in **exons 18-21 of the tyrosine kinase domain** of EGFR predict **sensitivity to treatment with EGFR (TKIs)***
  - *More common in females, nonsmokers, East Asian ethnicity*
- ***K-RAS mutations, BRAF, HER2 mutations****= Downstream of EGFR signaling cascade= mutually exclusive mutations*
- ***KRAS****= Adenocarcinoma, **mucinous** differentiation, smokers, adverse prognostic factor, resistance to EGFR TKI therapy*
- ***ALK rearrangements** resulting in **EML4- ALK fusion gene***
  - *non small-cell carcinoma of the lung, light or never smokers, younger at presentation.*
  - *This mutation seems to be mutually exclusive to that of EGFR and KRAS mutations.*
  - *Detected by FISH, RT-PCR, and IHC.*
- ***ROS1 rearrangements****: 1-2% of lung ADC; Response to crizotinib; More in light/never smokers, relatively younger pts.*