

LAB 3: THE CONNECTIVE TISSUE AND EPITHELIUM

The focus of this week's lab will be pathology of connective tissue and epithelium. The lab will introduce you to the four basic tissue types: *epithelium*, *connective tissue*, *muscle*, and *nerve*. Our pathology cases studies will focus on some of the tissues of the reproductive, respiratory, gastrointestinal and urinary systems that you will see in lab. This lab will help you identify types of epithelium and understand how their morphology is altered in disease states. Recall from lecture that there are different types of epithelium that are categorized based on cell shape and thickness of cell layers. *Simple epithelia* are usually one cell layer thick and the different types include: *squamous*, *cuboidal*, *columnar*, and *psuedostratified columnar*. In contrast *stratified epithelia* are usually multiple cell layers thick and include: *squamous (keratinized and non-keratinized)*, *cuboidal*, *columnar*, and *transitional*. You will learn to recognize these epithelia and identify changes in epithelia during pathogenesis.

Cells respond and adapt to stress in different ways. They can become *hypertrophic* where the cell increases in size or *atrophic* where they shrink in size. They can also increase in number—called *hyperplasia*. They can also change from one adult differentiated cell to another differentiated cell during regeneration; this is referred to as *metaplasia*. Metaplasia often occurs when cells change from one type of epithelium to another and can predispose cells to malignant transformation.

Carcinoma refers to a malignant cancer of epithelial origin. *Adenocarcinoma* is a malignant cancer of glandular epithelial origin. Many cancers are of epithelial origin; we will discuss a few carcinomas and other disorders of epithelia in this lab.

The cases we will cover are:

- A. **Serous Cystadenocarcinoma of the Ovaries:** Refer to virtual microscope slide p_239_v2 ovary, cystadenoma (similar but benign), compare to normal virtual microscope slide 086 ovary.
- B. **Squamous Cell Carcinoma of the Lung:** Refer to virtual microscope slide p_47 lung, squamous cell and compare to normal virtual microscope slide b_51 lung, human (hint look at darkly stained circles, bronchi).
- C. **Barrett's Esophagus:** Refer to virtual microscope slide Barrett's esophagus and compare to normal virtual microscope slide 107 Esophagus.

A. SEROUS CYSTADENOCARCINOMA OF THE OVARIES

CC/HPI: A 56 year old white nulliparous woman is referred for evaluation of a pelvic mass found on a routine physical. She reports an increased frequency in micturition and irregular periods until they ceased three years ago. She also has a history of breast cancer in her 20s.

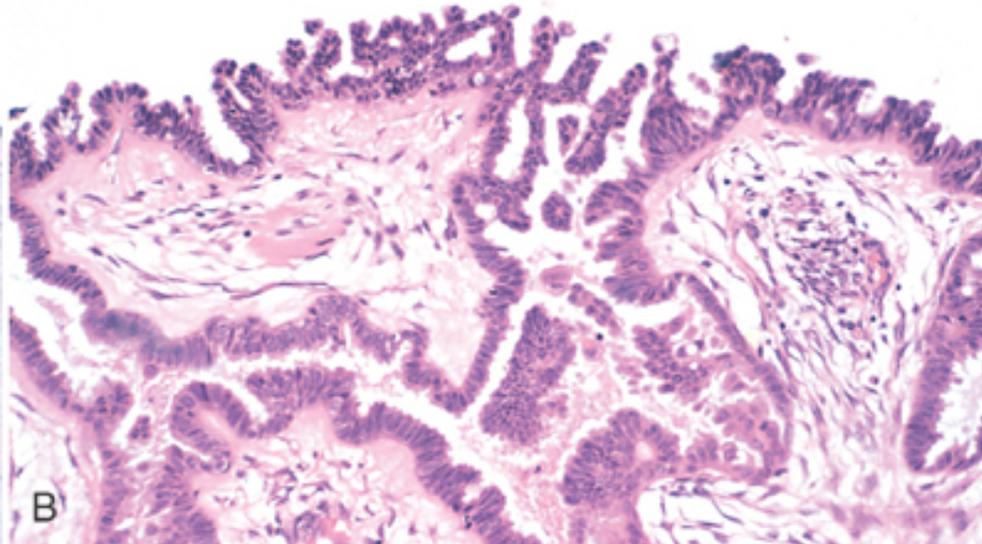
What is the significance of this patient's history of breast cancer?

PE: Physical exam reveals a large cystic mass the size of a grapefruit in right pelvis that can be felt above the pubic symphysis.

Labs/Imaging: CA-125 levels elevated; Liver function tests are normal. CT reveals a cystic pelvic mass in the right ovary.

What is CA-125? Why is it elevated here?

Pathology: A representative histological section from earlier in this disease progression is shown:



What type of epithelium usually covers the surface of the ovary?

What type of epithelium usually lines the fallopian tube?

What epithelium type lines the tumor shown here? How is this significant?

B. SQUAMOUS CELL CARCINOMA OF THE LUNG

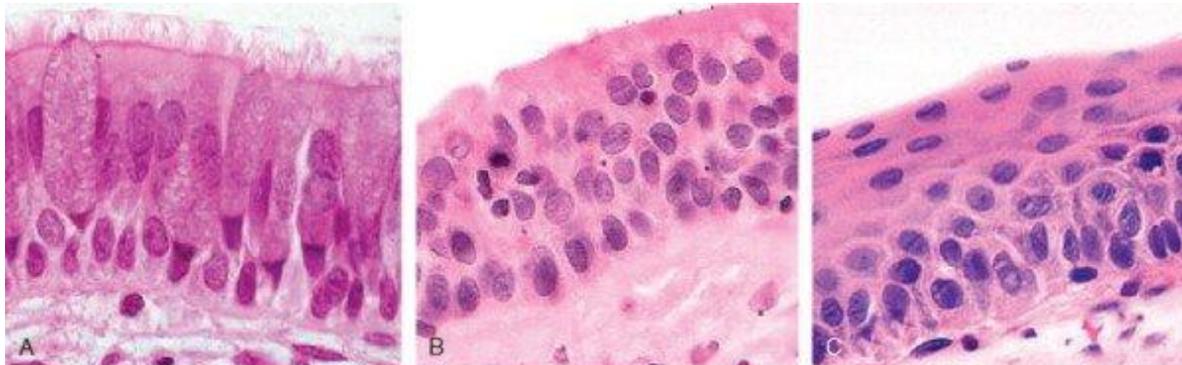
CC/HPI: A 54-year-old man presents with dyspnea, hoarseness, cough, and hemoptysis. He has an 80-pack-year smoking history. Over the past two months he had significant loss of appetite and weight.

PE: Physical exam reveals marked cachexia; clubbing of the digits; mild wheezing at rest; chest is barrel shaped (emphysematous) and movements diminished on right; dullness to percussion over right middle lobe; no breath sounds heard over right middle lobe; vocal fremitus reduced in same area.

Labs: CBC reveals normocytic, normochromic anemia. Gram and ZN stains of sputum for acid-fast bacilli are negative; sputum contains malignant cells. CT reveals hilar mass on right side, producing an obstructive atelectasis of right middle lobe. Bronchoscopy reveals right-sided hilar mass obstructing right middle bronchus.

What type of epithelium normally lines the bronchus?

Pathology: Sections from the bronchus representing early progression of this disease from left (normal) to right are shown below:



What are the brush-like structures present on the surface of the epithelium shown in the section on the left (A)? Are they present in the section on the right (C)?

What cell normally found in the bronchus is hyperplastic in the section in the middle and right? What is its normal function in the bronchus?

The section on the right shows what type of epithelium lining the bronchus?

This epithelial transition is known as...

C. BARRETT'S ESOPHAGUS

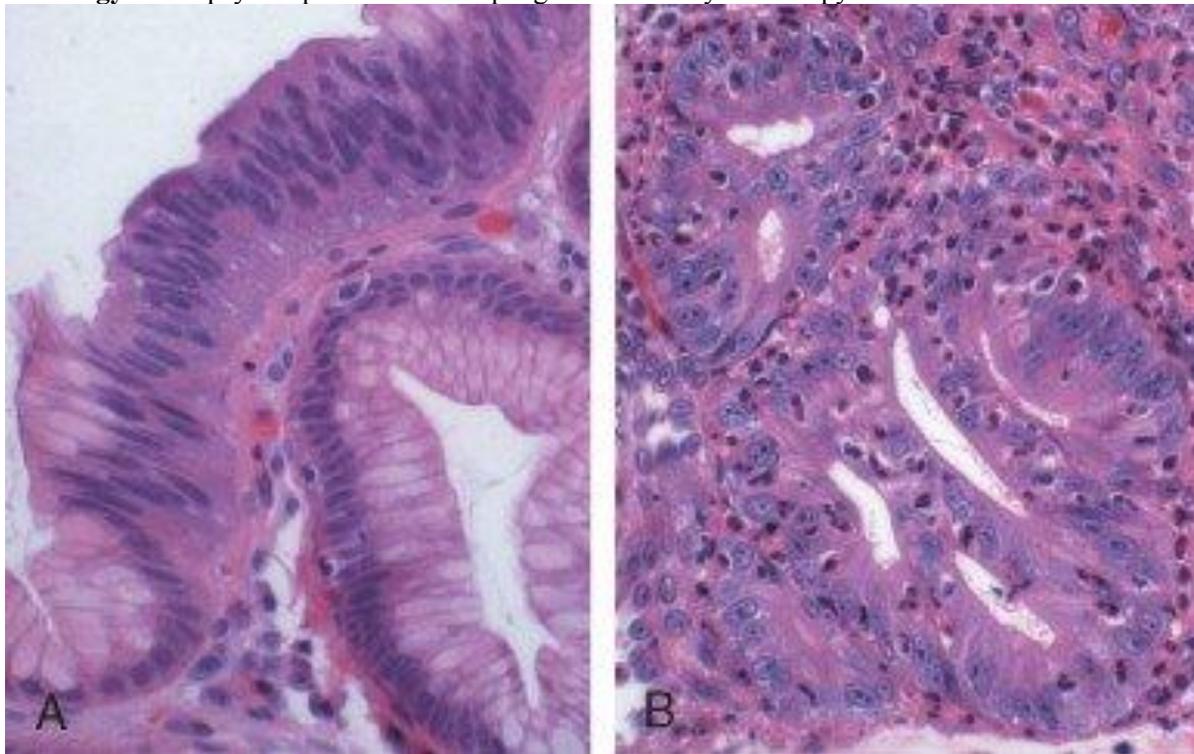
CC/HPI: A 50-year-old man presents with a long-standing history of retrosternal burning, belching, and waterbrash, especially after meals. He is a chronic smoker and alcoholic and is under treatment for gastroesophageal reflux dyspepsia.

PE: Physical exam normal.

Labs/Imaging: UGI endoscopy reveals linear streaks of red, velvety mucous at gastroesophageal junction. Barium swallow reveals fine reticular pattern distal to an esophageal stricture and gastroesophageal reflux.

What epithelium normally lines the inner esophageal surface?

Pathology: A biopsy sample from the esophagus obtained by endoscopy is shown:



What epithelium is present in this section?

Where is this type of epithelium usually found? A conversion from one epithelial type to another is an example of what?

What are the clear cells seen in the section on the left? What do they secrete?

Barrett's esophagus increases the risk for what kind of cancer?