I. Introduction

II. Learning Objectives

III. Slides and Micrographs

A. Salivary Glands
   1. Parotid gland
   2. Submandibular gland
B. Pancreas
C. Liver
D. Gall Bladder

IV. Summary

Fig 15-1, Junqueira, 13th ed.
Learning Objectives

1. Review the secretory units of the salivary glands.

2. Understand the structure and function of the cuboidal epithelium cells comprising the ducts.

3. Compare and contrast the histology and exocrine function of the pancreas with that of the parotid salivary gland.

4. Understand the overall organization of lobes and vasculature in the liver.

5. Understand the microvascular features specific to the liver and the function of the hepatocytes.

6. Understand the origin of bile and the system transporting it from the liver.

7. Understand the structure of the gall bladder wall and how it facilitates the organ’s function.
Comparison of Major Salivary Glands

II. Learning Objectives

III. Slides and Micrographs

A. Salivary Glands
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D. Gall Bladder

IV. Summary

- Compound acinar
- Serous acini only

- Compound tubuloacinar
- Serous acini and mucuous tubules
- Serous demilunes
Excretory Pathway from Salivary Glands

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Excretory pathway from salivary glands:

- **Secretory cells**
- **Intercalated ducts**: small/closed-appearing lumen (generally smaller than acinus); lined with simple squamous or cuboidal epithelium; often surrounded by myoepithelial cells
- **Striated (intralobular) ducts**: larger, open lumen; lined with simple cuboidal (or columnar) cells with basal striations
- **Interlobular ducts**: in septa; increasing size; and epithelium transitioning from simple cuboidal to columnar epithelium; may be stratified
- **Excretory (lobar) ducts**: largest; from superficial and deep lobes of gland; stratified cuboidal or maybe columnar epithelium
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IV. Summary

Slide 132: Parotid Gland, H&E

- capsule
- septa divide lobules of glands
- excretory duct
- lobule
- striated ducts

Presence of ducts distinguishes organ as exocrine gland – so not to be confused with any of the lymphoid structures.
I. Introduction

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III. Slides and Micrographs

A. Salivary Glands
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   2. Submandibular gland

B. Pancreas
C. Liver
D. Gall Bladder

IV. Summary

Slide 132: Parotid Gland, H&E

- septum
- striated ducts
- adipose
- excretory duct
I. Introduction
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III. Slides and Micrographs
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      1. Parotid gland
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   B. Pancreas
   C. Liver
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IV. Summary

Slide 132: Parotid Gland, H&E

- parenchyma is composed of serous acini only
- striated duct
- adipose
- excretory duct in septum
I. Introduction

II. Learning Objectives

III. Slides and Micrographs
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      1. Parotid gland
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IV. Summary

**Slide 132: Parotid Gland, H&E**

*striated duct* with faint “striation” in basal half of cell perpendicular to lumen
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III. Slides and Micrographs
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      2. Submandibular gland
   B. Pancreas
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IV. Summary

Slide 11: Submandibular Gland, PAS AB

parenchyma consists of both serous and mucous cells

Dark staining cells = mucous cells
Light staining cells = serous cells

striated duct
I. Introduction
II. Learning Objectives
III. Slides and Micrographs
   A. Salivary Glands
      1. Parotid gland
      2. **Submandibular gland**
   B. Pancreas
   C. Liver
   D. Gall Bladder
IV. Summary

**Slide 11: Submandibular Gland, PAS AB**

- Notice the difference in tissue lining lumen between duct and vessel
- Excretory duct
Serous acini secrete non-glycosylated protein products and stain strongly due to their abundant rER and secretory granules; Mucous acini secrete mucus (mucopolysaccharide) and contain little rER so tend to be poorer-staining with most general stains.
I. Introduction

II. Learning Objectives

III. Slides and Micrographs

A. Salivary Glands
   1. Parotid gland
   2. Submandibular gland

B. Pancreas

C. Liver

D. Gall Bladder

IV. Summary

Slide 15: Pancreas, H&E

Like the salivary glands, notice organization into lobules, separated by CT septa; however, notice the lack of conspicuous striated (intralobular) ducts in the lobules as were seen in the salivary glands.
Slide 154: Pancreas, H&E

The pancreas is divided into excretory and endocrine portions:

- **Dark cells =** secretory acini (excretory)
- **Light clusters of cells =** Pancreatic islets (endocrine) (Islets of Langerhans)
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IV. Summary

Slide 154: Pancreas, H&E

intralobular **excretory duct**
(only one type of intralobular duct, unlike in salivary glands)

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**Pancreatic islet or islet of Langerhans (endocrine)**

**Secretory acini (exocrine)**
serous acini of the exocrine pancreas have 5-10 cells facing central lumen; apical ends are eosinophilic due to secretory granules; basal ends are basophilic due to nucleus and rER
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Slide 24: Liver & GB, Masson Trichrome

- larger spaces = portal triads
- smaller spaces = central veins
I. Introduction

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IV. Summary

Slide 141: Liver, H&E

Portal Tract/Triad
hepatic portal vein

hepatic artery

bile duct
I. Introduction

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IV. Summary

Slide 24: Liver, Masson Trichrome

- central vein
- hepatic lobule
I. Introduction

II. Learning Objectives

III. Slides and Micrographs

A. Salivary Glands
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IV. Summary
Slide 24: Liver, Masson Trichrome

- Kupffer cell (macrophage) in sinusoid
- Hepatocytes
- Hepatic sinusoids lined by endothelial cells
I. Introduction

II. Learning Objectives

III. Slides and Micrographs
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IV. Summary

Slide 24: Liver, Masson Trichrome

lipofuscin
I. Introduction

II. Learning Objectives

III. Slides and Micrographs

A. Salivary Glands
   1. Parotid gland
   2. Submandibular gland

B. Pancreas

C. Liver

D. Gall Bladder

IV. Summary

Slide 94: Gallbladder, Trichrome

- Serosa: on free surface; covered by adventitia where bound by liver
- Muscularis
- Lamina propria
- Mucosa

Note the lack of muscularis mucosae and submucosa; the lamina propria is directly on the muscularis layer.
I. Introduction
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IV. Summary

Slide 94: Gallbladder, Trichrome

mucosal fold/ruga: transient folds of mucosa; disappear when gallbladder is full
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IV. Summary

Slide 94: Gallbladder, Trichrome

- simple columnar epithelium, with NO goblet cells
- very thin basement membrane
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IV. Summary

Slide 105: Gallbladder, H&E

epithelium
muscularis
lamina propria
serosa/adventitia
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IV. Summary

Gallstones
EMs to Examine

Fig 16-4: Serous and mucous cells
Fig 16-10: Pancreatic acinar cells
Fig 16-14: Hepatocytes, perisinusoidal space, and bile canaliculi
Fig 16-20: Gallbladder
I. Introduction

II. Learning Objectives

III. Slides and Micrographs

A. Salivary Glands
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IV. Summary

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Common Confusion:
Parotid gland vs. Pancreas

**Parotid Gland**: major salivary gland located in front of ear; almost exclusively serous cells that produce a thin watery secretion rich in enzymes (e.g., amylase)

Look for: (1) striated (intralobular) ducts are readily visible; (2) surrounded by CT capsule with defined septa; (3) adipocytes may be present between lobules

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**Pancreas**: exocrine and endocrine gland located in upper left of abdomen; exocrine portion is purely serous and empties into the duodenum

Look for: (1) pale-staining pancreatic islets (endocrine); (2) ducts are fewer and less readily seen; (3) surrounded by loose CT or very thin capsule with delicate septa; (4) at higher magnification, pale-staining centroacinar cells (where duct inserts into acinus) may be seen
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IV. Summary

Common Confusion:
Pancreas vs. Spleen

Pancreas: exocrine and endocrine gland located in upper abdomen; exocrine portion is purely serous and empties into the duodenum

Look for: (1) exocrine gland, so ducts are present; (2) pale-staining pancreatic islets (endocrine) have homochromatic appearance; (3) at higher magnification, cells arranged in acinar configuration

Slide 154, Pancreas

Spleen: highly-vascular abdominal organ with abundant lymphoid tissue; filters the blood, providing immune functions and removal/destruction of old or faulty red blood cells

Look for: (1) no exocrine tissue, so lacks ducts; (2) white pulp has heterochromatic staining, e.g., pale germinal centers surrounded by dark mantle zone; (3) no acini present; (4) numerous trabeculae

Slide 68, Spleen