MICROSCOPIC ANATOMY OF THE GI

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ORAL CAVITY

The oral cavity is formed by a bewildering array of tissues which function in or are associated with the processes that are performed with what we typically refer to as our mouthwithin the oral cavity, the tongue, and the glands which empty their secretory products into the oral cavity, the salivary glands. In the lab you will also have the opportunity the examine one other specialized epithelial area, the lip.

The oesophagus is the first part of the alimentary canal. Its organisation is also typical for all parts of the gastrointestinal tract (GIT).

The oral cavity is divided in a <u>vestibule, the area "outside" the teeth, and an oral cavity</u> <u>proper</u>.

The entire oral cavity is lined by a stratified squamous epithelium.

The epithelial lining is divided into two broad types:

<u>Masticatory epithelium</u> covers the surfaces involved in the processing of food (tongue, gingivae and hard palate). The epithelium is keratinized to different degrees depending on the extent of physical forces exerted on it.

Lining epithelium, i.e. non-keratinised stratified squamous epithelium, covers the remaining surfaces of the oral cavity.

THE TONGUE HISTOLOGY

D PAPILLAE

- □ TASTE BUDS
- □ SKELETAL MUSCLE FIBERS
- LINGUAL SALIVARY GLAND



Tongue – Function?

- Mainly skeletal muscle
- Functions: mixing food with saliva, moving food to throat or pharynx to swallow.
- □ <u>Papillae</u> small rough projections on tongue →help hold food and contain taste buds
- Frenulum holds tongue down in front
- Root back of tongue attached to hyoid bone



Tongue - Schematic Stereogram

Dorsal Surface of the Tongue



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Detail of circumvallate papilla, showing pale taste buds opening into the lumen of the furrow that surrounds the papilla.

Stained with haematoxylin and eosin 1 - epithelium covering papilla

(stratified squamous nonkeratinizing)

- 2 core of the papilla (lamina propria of the mucosa of dorsal surface of the tongue)
- 3 taste bud

A HLIFORM PAPILLAE OF THE TONGUE

- 1 epithelium covering papilla (stratified squamous keratinizing)
- 2 keratinized layer of the epithelium
- 3 core of the papilla (lamina propria of the mucosa of dorsal surface of the tongue)
- 2 tongue muscles



CIRCUMVALLATE PAPILLAE OF THE TONGUE

Stained with haematoxylin and eosin

1 - epithelium covering papilla (stratified squamous

nonkeratinizing)

2 - core of the papilla (lamina propria

of the mucosa of dorsal surface of the tongue)

3 - taste buds

Histology Lab Part 13: Slide 32



Detail of skeletal muscle and secretory glands of the body of the tongue.

Mucous cells are to the left, with their flattened, basal nuclei, while serous cells are in the center and to the right, with their round nuclei.

Histology Lab Part 13: Slide 31



View of foliate papillae, typical of rabbit and some other animals.

These have a characteristic 3-pronged connective tissue pattern extending up into the papilla, and there are taste buds on the outside walls.

Notice the bundles of skeletal muscle down below.

Histology Lab Part 13: Slide 30

Higher magnification of tongue surface, showing two filiform papillae. They are obviously extensions of <u>stratified squamous</u> <u>epithelium.</u>



Histology Lab Part 13: Slide 28

Cut-away section of tongue to show threedimensional view of papillae and underlying c.t. and muscle.

Histology Lab Part 13: Slide 29



Section of surface of tongue, showing one rather tangentially cut fungiform papilla at the left and some filiform papillae with sharp, semicornified tips at the right.

Cornification is less extensive in human tongue than in cats, dogs, etc.

SALIVARY GLANDS

Stained with haematoxylin and eosin

1 - serous secretory units (acini)

2 - intercalated excretory duct

3 - striated excretory duct

4 - interlobular excretory duct

5 - interlobular connective tissue septa



- 1 serous secretory units
- 2 striated excretory duct
- 3 interlobular excretory duct



Stained with haematoxylin and eosin 1 - serous secretory units

2 - intercalated excretory duct

3 - striated excretory duct





Stained with haematoxylin and eosin

- 1 serous secretory units
- 2 myoepithelial cells
- 4 interlobular excretory duct
- 5 interlobular connective

tissue septa

PAROTID SALIVARY GLAND interlobular excretory duct

- 1 interlobular excretory duct
- 2 interlobular connective tissue septa



- 1 lobules of the gland
- 2 interlobular connective tissue septa
- 3 interlobular excretory duct



Stained with haematoxylin and eosin 1 - mucous part of mixed secretory unit

- 2 serous part (serous demilune) of mixed secretory unit
- 3 serous secretory unit
- 4 mucous secretory unit
- 5 intercalated excretory duct
- 6 striated excretory duct
- 7 interlobular excretory duct
- 8 interlobular connective tissue septa



- 1 mucous part of mixed secretory unit
- 2 serous part (serous demilune) of mixed secretory unit
- 3 serous secretory unit
- 4 mucous secretory unit
- 5 myoepithelial cells



- 1 mucous part of mixed secretory unit
- 2 serous part (serous demilune) of mixed secretory unit
- 3 serous secretory unit
- 5 myoepithelial cells
- 6 intercalated excretory duct
- 7 interlobular excretory duct
- 8 interlobular connective tissue septa



SUBMANDIBULAR SALIVARY GLAND

Stained with haematoxylin and eosin 1 - serous secretory unit

- 2 mixed secretory unit
- 3 intercalated excretory duct
- 4 striated excretory duct
- 5 interlobular excretory duct
- 6 interlobular connective tissue septa
- 7 mucous part of mixed secretory unit
- 8 serous part (serous demilune) of mixed secretory unit



SUBMANDIBULAR SALIVARY GLAND

- 1 serous secretory unit
- 2 mixed secretory unit
- 3 intercalated excretory duct
- 4 striated excretory duct



ESOPHAGUS, STOMACH

- 1 tunica mucosa
- 2 tunica submucosa
- 3 tunica muscularis propria
- 4 tunica adventitia
- 5 epithelium of the mucosa
- 6 lamina propria of the mucosa
- 7 muscularis mucosae
- 8 glands in the lamina propria





- 1 tunica mucosa
- 2 tunica submucosa
- 5 epithelium of the mucosa
- 6 lamina propria of the mucosa
- 7 muscularis mucosae
- 8 glands in the lamina propria



- 1 tunica mucosa
- 2 tunica submucosa
- 3 tunica muscularis propria
- 4 tunica adventitia
- 5 epithelium of the mucosa
- 6 lamina propria of the mucosa
- 7 muscularis mucosae
- 8 glands in the lamina propria



Stained with haematoxylin and

eosin

- 1 tunica mucosa
- 2 tunica submucosa
- 3 tunica muscularis propria
- 5 epithelium of the mucosa
- 6 lamina propria of the mucosa
- 9 glands in the submucosa



GASTRO-ESOPHAGEAL JUNCTION

- 1 stomach
- 2 esophagus



FUNDAL PART OF THE STOMACH

- 1 tunica mucosa
- 2 tunica submucosa
- 3 tunica muscularis propria
- 4 tunica serosa
- 5 epithelium of the mucosa
- 6 lamina propria of the mucosa (contains glands)
- 7 muscularis mucosae



PYLORIC PART OF THE STOMACH

- 1 tunica mucosa
- 2 tunica submucosa
- 3 tunica muscularis propria
- 5 lamina propria of the mucosa (contains glands)
- 7 gastric pits in the mucosa
- 8 muscularis mucosae





FUNDAL PART (left), PYLORIC PART (right) OF THE STOMACH

- 1 epithelium of the mucosa
- 2 gastric pits in the mucosa
- 3 glands in the lamina propria

INTESTINE



DUODENUM

- 1 tunica mucosa
- 2 tunica submucosa
- 3 tunica muscularis propria
- 4 tunica serosa
- 5 villi
- 6 glands (crypts) in the lamina propria of the mucosa
- 7 glands in the tunica submucosa (Brunner's glands)



JEJUNUM

- Stained with haematoxylin and eosin
- 1 tunica mucosa
- 2 tunica submucosa
- 3 tunica muscularis propria
- 4 tunica serosa
- 5 villi
- 6 glands (crypts) in the lamina propria of the mucosa





ILEUM

- 1 tunica mucosa
- 2 tunica submucosa
- 3 tunica muscularis propria
- 4 tunica serosa
- 5 villi
- 6 epithelium of the mucosa (covers villi)
- 7 connective tissue of the lamina propria of the mucosa
- 6 glands (crypts) in the lamina propria of the mucosa





COLON

Stained with haematoxylin and eosin 1 tunica mucosa

- 2 tunica submucosa
- 3 tunica muscularis propria
- 4 tunica serosa
- 5 lymphoid follicle in the lamina propria of the mucosa

COLON

- Stained with haematoxylin and eosin
- 1 tunica mucosa
- 2 tunica submucosa
- 3 tunica muscularis propria
- 4 tunica serosa

COLON

- 1 tunica mucosa
- 2 tunica submucosa
- 3 tunica muscularis propria
- 4 tunica serosa
- 5 glands (crypts) in the lamina propria of the mucosa



COLON

Stained with mucicarmin

- 1 tunica mucosa
- 2 tunica submucosa
- 3 goblet cells in the epithelium of crypts (stained with red-magenta color)



LIVER, PANCREAS

- 1 hepatic artery
- 2 portal vien
- 3 bile duct
- 4 hepatocytes
- 1, 2, 3 portal tract



- 1 hepatic artery
- 2 portal vien
- 3 bile duct
- 1, 2, 3 portal tract



Stained with haematoxylin and eosin

- 4 hepatocytes
- 5 terminal hepatic (centrilobular) venule

LIVER

- 4 hepatocytes
- 5 terminal hepatic (centrilobular) venule
- 6 hepatic sinusoid



Stained with haematoxylin and eosin

1 - capsule

2 - liver parenchyma



LIVER

- 1 capsule
- 2 liver parenchyma
- 4 hepatocytes

PANCREAS

- 1 glandular acinus
- 2 islet of Langerhans
- 3 main duct
- 4 interlobular duct
- 5 interlobular connective tissue septa



PANCREAS

Stained with haematoxylin and eosin 1 - acinus

- 2 islet of Langerhans
- 3 interlobular connective tissue septa
- 4 intralobular duct
- 5 interlobular duct

PANCREAS

Stained with haematoxylin and eosin 1 - acinus

- 2 islet of Langerhans
- 3 interlobular connective tissue septa
- 4 blood vessels



PANCREAS

- 1 acinus
- 2 islet of Langerhans
- 3 intralobular duct
- 4 interlobular connective tissue septa

