

DIGESTIVE SYSTEM - (first of three laboratory sessions)

LABORATORY 22 - ORAL CAVITY

OBJECTIVES: **LIGHT MICROSCOPY:** Recognize structure and characteristics of organs that are associated with the oral cavity: lip and its three regions; recognize all of the components of and distinguish between the three large paired salivary glands, parotid, submandibular and sublingual. Recognize adult and developing tooth and the differences between the components from which it is formed including the three hard connective tissues and the different cell types responsible for synthesis of these tissues. Also, understand the structure of the tongue and distinguish between the different types of papillae located on its dorsal surface.

ELECTRON MICROSCOPY: Secretory units and characteristics of ducts of salivary glands.

ASSIGNMENT FOR TODAY'S LABORATORY

GLASS SLIDES

- [SL 90](#) Lip
- [SL 91](#) Parotid
- [SL 92](#) Submandibular gland
- [SL 93](#) Sublingual gland
- [SL 42](#) Fetal tooth (pig snout)
- [SL 94A](#) Fetal tooth (and [SL 94B](#))
- [SL 70](#) Tongue
- [SL 72](#) Base of tongue

HISTOLOGY IMAGE REVIEW - available on computers in HSL

Chapter 13, Oral Cavity

Frames: 841-891

SUPPLEMENTARY ELECTRON MICROGRAPHS

Rhodin, J. A.G., An Atlas of Histology

Copies of this text are on reserve in the HSL.

Oral Cavity pp. 290 - 304

- A. LIP (mucocutaneous junction) - [SL 90 \(scan\)](#). (W. 13.1). There are three regions of the lip:
1. [SKIN](#) (Review parts of skin.)
 2. [TRANSITION AREA](#) (How does this region differ from other skin?)
 3. [MUCOSA](#) (mucous membrane).

Compare the three regions in terms of epithelium, connective tissue, blood vessels, types of glands, etc. Identify the type of muscle that comprises a substantial part of the region between the mucosa (on the inner surface) and the skin (on the outer surface).

- B. Major Salivary Glands - PAROTID, SUBMANDIBULAR and SUBLINGUAL GLANDS.
1. These three large paired salivary glands have many features in common as well as distinguishing features. The glands are compound tubuloalveolar, merocrine, exocrine, multicellular glands. The parotid gland is a serous secreting gland, whereas the submandibular and sublingual have both serous and mucous (seromucous) secretion. However, the sublingual is primarily mucous secreting. The morphology and function of the duct system also varies. The three types of ducts may be classified as follows:
 - a. [intercalated ducts](#), ([within red circle](#)) that are lined by cuboidal epithelium and may have myoepithelial cells associated with them.
 - b. [striated ducts](#) ([high within blue circles](#)), [oil](#)) that are lined by columnar epithelium and influence the secretory product by active transport.
 - c. [excretory ducts](#) ([within green circle](#)), that are initially lined by columnar to pseudostratified columnar epithelium. More distally, the lining epithelium is stratified cuboidal or columnar and near to the surface of the oral cavity, the duct lining may be stratified squamous epithelium.

The ducts also may be classified as intralobular (within lobules), interlobular (between lobules) and interlobar (between lobes) on the basis of their location.

As you look at the different salivary glands analyze the alveoli of each gland, the duct systems (proportion of each type), as well as the stroma (connective tissue elements). The ducts and secretory end pieces, composed of epithelium, are considered to be the parenchyma of the gland whereas all of the connective tissue is called the stroma of the gland.

2. PAROTID GLAND. [SL 91 \(scan\)](#). (J. 16-2; W. 13.15; 13.18). The secretory end pieces of the parotid gland are limited to [serous acini](#). The [intercalated ducts](#) are longer in this gland than in the other two glands and striated and excretory ducts are evident. (In order to see intercalated ducts more clearly look at the slide of pancreas SL 2 or 108). The parotid gland tends to have more fat cells in the stroma than the submandibular or sublingual gland.
3. SUBMANDIBULAR GLAND. [SL 92 \(scan\)](#). (J. 16-4; W. 13.17). Make a rough estimate of the ratio between serous and [mucous acini](#) ([several mucous acini enclosed by blue line](#)) particularly those alveoli that have [demilunes](#) ([several enclosed by red lines](#)) of serous cells. These secrete into the lumen of the mucous acini through intercellular secretory canaliculi.
4. SUBLINGUAL GLAND. [SL 93 \(low, med, high\)](#). (J. 16-5; W. 13.16) – In contrast to the other two glands, mucous acini predominate in the sublingual gland. Demilunes are less numerous than in the submandibular gland. Another characteristic is that the ducts are shorter and therefore fewer sections of ducts are found.

C. TOOTH

1. [SL 42](#). (J. 15-4, 15-5, 15-8A; W. 13.5). Fetal tooth, pig snout. There are one or two early stages of developing tooth on this slide. From diagrams in the lecture notes, atlas and text identify as many of the following structures as possible: dental lamina (structure from which the enamel organ forms); the enamel organ and its four layers (med, high), ameloblasts (also referred to as inner enamel epithelium), stratum intermedium, stellate reticulum and outer enamel epithelium (layers of enamel organ and other structures indicated) (red arrow, outer enamel epithelium) periodontal tissue; alveolar bone (compact or cancellous?); dental papilla; odontoblasts, predentin, dentin, dentinal tubules (tubules easier to see in next slide).
2. [SL 94A](#) and [SL 94B](#). (Even desks only) - Fetal tooth - later stage of development. Slides vary as to the number of structures that can be observed. Slides will either have
 - a. a tooth in a late stage of development, showing - ameloblasts, enamel (may be represented by a space since the enamel was removed during preparation), dentin, odontoblasts, etc. or
 - b. the section will contain a tooth that includes the root allowing observation of dentin, odontoblasts and cementum, periodontal tissue, (W. 13.8) etc. (scan, high 1, high 2 (cementum, blue arrows)). Observe the structure of the root and the relationship between cementum and dentin as shown in text and atlas (J. 15-8A; W. 13.3).

In addition to the structures referred to above, identify the pulp cavity. The periodontal ligament (referred to as membrane in atlas) may not be readily apparent, but you should appreciate its location. From the illustrations and discussion in the text and atlas and your lecture notes be able to describe the stage of development of a tooth from dental lamina to the fully formed adult tooth. Compare and contrast the structure of a tooth with bone.

- D. TONGUE - Tip of tongue. [SL 70 \(scan\)](#) (J. 15-2; W. 13.10, 13.11). Examine and compare the ventral (lower) and dorsal surfaces of the tongue. Where are the papillae located? This slide shows two types of papillae:
1. Filiform (most numerous) - conical - epithelium stratified squamous and partially keratinized
 2. Fungiform- epithelium non-keratinized - taste buds located on dorsal surface

This slide demonstrates the muscle of the tongue. Identify the type of muscle and orientations of the fibers.

Base of tongue. [SL 72](#) A circumvallate papilla may be present on slide (if not, borrow a slide that shows one). Observe the glands and taste buds (red arrows) (J. 15-3) associated with the circumvallate papilla. What type(s) of glands are present? (J. 15-2; W. 13.12, 21.1). (Foliate papillae are not present on your slides. Refer to text for a brief description, J. p. 293).

OBJECTIVES FOR LABORATORY 22: ORAL CAVITY

1. Using the light microscope or digital slides, identify:

Lip

Skin
Transition region
Mucosa

Salivary glands

Structures within each gland

Acini

Serous acini
Mucus acini
Serous demilunes
Myoepithelial cells

Ducts

Intercalated
Striated
Excretory

Types of salivary glands

Parotid
Submandibular
Sublingual

Tooth

Early development (fetal pig snout, SL42)

Enamel organ

Dental lamina
Ameloblasts
Enamel

Stratum intermedium
Stellate reticulum
Outer enamel epithelium

Dental papilla

Odontoblasts
Predentin and Dentin

Pulp cavity

Alveolar bone

Later development (SL 94A and 94B)

Ameloblasts

Enamel
Predentin
Dentin

Dentinal tubules

Odontoblasts

Cementum

Cementoblasts

Periodontal tissue

Alveolar bone

Pulp cavity

Tongue

Papilla

Filiform
Fungiform
Circumvallate

Serous glands

Taste buds