COURSE DATA

Data Subject	
Code	34701
Name	Histology
Cycle	Grade
ECTS Credits	6.0
Academic year	2024 - 2025

Study (s)

Degree	Center	Acad. year	Period
1206 - Degree in Dentistry	Faculty of Medicine and Odontology	1	Second term

Subject-matter

Degree	Subject-matter	Character
1206 - Degree in Dentistry	6 - Histology	Basic Training

Coordination

Name	Department
MATA ROIG, MANUEL	285 - Pathology

SUMMARY

The subject program includes topics of General Histology, where the microscopic structure of the basic tissues (epithelial, connective, muscular and nervous) and organ systems with dental significance are analyzed, and others that address Special Histology, where in depth the structure and organization of the tissues and organs of the stomatognathic system in a healthy state.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

It is recommended that the student relates the acquired knowledge in this subject to those of other disciplines, such as Cytology, Cell Biology, Biochemistry, Physiology, Anatomy, etc.

COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

1206 - Degree in Dentistry

- Understand and recognise the structure and normal functioning of the stomatognathic system at the molecular, cellular, tissue and organic levels, in the different stages of life.
- Know how to use the sources of clinical and biomedical information available, and value them critically in order to obtain, organise, interpret and communicate scientific and sanitary information.
- Understand the scientific method and be able to critically evaluate established knowledge and new information. Be capable of formulating hypotheses and of collecting and critically assessing information to resolve problems according to the scientific method.
- Module: Basic Biomedical Sciences Relevant to Dentistry - Know the biomedical sciences on which dentistry is based in order to ensure proper oral care. These sciences should include appropriate content of embryology, anatomy, histology and physiology of the human body. Genetics, Biochemistry, Cellular and Molecular Biology, Microbiology and Immunology.

LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

English version is not available

DESCRIPTION OF CONTENTS

1. Concept and classification of tissues. Epithelial tissue. Lining epithelia. Dental significance

1. Organization and histological structure of tissues.
2. Concept of Histology. Classification and general characteristics of the tissues.
3. Epithelial tissue. Lining and glandular epithelia.
4. Morphological criteria for the classification of epithelial tissues. Optical and ultrastructural morphology of epithelial cells.
5. Simple or monostratified epithelia (squamous, cubic, and columnar).
6. Pseudostratified epithelia. Transitional epithelium or urothelium.
7. Squamous stratified epithelia (keratinized and non-keratinized), cuboidal and columnar.

2. 2. Glandular epithelia. Exocrine and endocrine glands. Dental significance.

1. Concept and classification of glandular epithelia. Exocrine and endocrine glands.
2. Morphological characteristics of the secretion process: types of secretion; secretion granule.
3. Structural characteristics of the exocrine glands according to their architecture: intraepithelial and exoepithelial glands. Exoepithelial glands: morphology of the excretory duct and the adenomere.
4. Structural characteristics of the glandular cells according to the nature of the secretion product.
5. Morphological varieties of the glands according to the extrusion mechanism.
6. Endocrine glands: varieties according to their histological organization and secretion.
7. Mixed glands.

3. Connective tissue. Structure and components. Study of the basement membrane.

1. Fixed cells of connective tissue: fibroblast-fibrocyte, pluripotential mesenchymal cell, reticular cell, myofibroblast and adipocyte.
2. Mobile cells: monocyte - macrophage, polymorphonuclear cells, mast cells, and plasma cells.
3. Amorphous ground substance: proteoglycans, glycosaminoglycans and adhesion glycoproteins.
4. Optical and ultrastructural microscopy morphology of collagen, reticular and elastic fibers.
5. Basement membrane: structure at optical and electron microscopy.

4. Classification and varieties of connective tissue. Dental significance.

1. Connective tissue classification criteria: modeled and non-modeled.
2. Unmodeled connective tissues: characteristics, structural organization, and distribution of the different varieties:

a. cell-rich tissues (embryonic-mesenchyme).
b. tissues rich in ground substance (mucous).
c. balanced tissues (loose connective tissue).
d. tissues rich in collagen fibers (fibrous or dense, with disordered and ordered bundles).
e. tissues rich in reticulin fibers (reticular tissue).
f. tissues rich in elastic fibers (elastic tissue).

5. Adipose tissue. Melanic tissue. Cartilage. Dental significance.

1. Concept and general characteristics of adipose tissue.
2. Distribution, optical and ultrastructural morphology of common, white and brown fat. Dental significance.
3. Concept of melanic tissue/pigmentary system. Cells and melanosomes.
4. General structure of the cartilage: morphological characteristics and composition, optical and ultrastructural morphology. Perichondrium.
5. Varieties: hyaline, elastic, and fibrous cartilages. Specific structural characters and distribution.
6. Formation and growth of the cartilage.

6. Bone tissue. Dental significance.

1. Concept and varieties of the bone tissue: compact and spongy.
2. Structural components: cells, organic matrix, and inorganic component.
3. Microscopic characters of osteoprogenitor cells, osteoblasts, osteocytes and bone lining cells.
4. Microscopic characters of the osteodestructive cells (osteoclasts).
5. Structural characters and biological significance of the non-laminar or primary bone, and of the laminar or secondary bone.
6. Microscopic structure of the bone lamella. Lamellar systems of compact bone: osteons or Haversian systems, internal and external circumferential systems, and interstitial systems. Lamellar systems of cancellous bone.

7. Bone connective sheaths. Ossification. Dental significance.

1. Periosteum and endosteum: histological and topographic characteristics.
2. Concept of ossification. Types.
3. Intramembranous, endo-connective, or direct primary ossification: microscopic characteristics of the formation of spongy primary bone and of the formation of compact primary bone.
4. Endochondral or indirect primary ossification: model for the long bones formation.

8. External and internal bone modeling. Study of the temporomandibular complex. Dental significance.

1. Structural changes during the growth of long bones: formation of secondary epiphyseal nuclei, structure of the metaphyseal cartilage, formation of guiding trabeculae and periosteal growth.
2. Modeling of flat bones.
3. Internal modeling or remodeling of compact bone tissue: Bone Remodeling Units (BRU), cells involved and distribution sequence.
4. Remodeling of spongy bone tissue.
5. Histological structure of the temporo-mandibular complex: articular surfaces (glenoid cavity, condyle), articular disc, ligaments and capsule, synovial membranes, and synovial fluid.

9. Muscle tissue. Striated and smooth variants. Dental significance.

1. Histological organization: types of muscle fibers and connective tissue (endomysium, perimysium, epimysium).
2. Extrafusal skeletal striated muscle fiber: study under optical and ultrastructural microscopy of the nuclear characteristics and the sarcoplasm, myofibrils and sarcomeres. Satellite cells.
3. Cardiac striated muscle tissue: cardiomyocytes and cardionector cells. Characteristics under light and electron microscopy
4. Smooth muscle tissue: characteristics under light and electron microscopy of the common smooth cell.
5. Specialized variants of smooth muscle fibers: myoepithelial, myofibroblastic, racemose, myoepithelioid, pericyte and myoid cells.

10. Nervous tissue. Neuron and synapse. Central and peripheral glia.

1. General morphological characteristics of the nervous tissue and classification. Histological methods to study of the nervous system.
2. Neuron: general characteristics. Neuronal soma: structure of its components. Dendrites: optical and electronic characteristics. Axon: structure of its different portions. Morphological classification.
3. Synapse. Definition and morphological types. Structural components of the various portions.
4. Glia of the central nervous system. General characteristics and classification. Optical and electron microscopy of the astroglia, oligodendroglia, microglia and epithelial glia.
5. Peripheral glia.

11. General architecture of the organs of the central nervous system. Nerve fiber. Architecture of the ganglia and the nerve endings. Dental significance.

1. General architecture of the organs of the central nervous system.
2. Sensory and vegetative ganglia.
3. Structure of myelinated and unmyelinated fibers of the central and peripheral nervous systems: participation of glial cells; myelination process.
4. Sensory nerve endings.
5. Motor nerve endings.

12. Blood and Circulatory system. Dental significance.

1. Light and electron microscopy characters of erythrocytes cells, platelets, granulocytes, lymphocytes, monocytes, and related cells.
2. General structure of the circulatory system.
3. Classification and structure of the different types of arteries.
4. Terminal circulation. Arteriovenous communications.
5. Classification and histological structure of the capillary system.
6. Histological structure of the veins and lymphatic vessels.
7. Cardiac structure.

13. Immune system. Study of the tonsil system. Dental significance.

1. General structure and varieties of lymphoid tissue: diffuse and nodular lymphoid tissue.
2. Classification of lymphoid organs, primary and secondary.
3. Microscopic structure of the primary lymphoid organs: bone marrow and thymus.
4. Histological structure of other secondary lymphoid organs: lymph nodes and spleen.
5. Mucosa-associated lymphoid tissue (MALT). Histological study of the tonsil system.

14. Integumentary system, and endocrine epithelial system.

1. Structure of the skin and its annexes.
2. Study of the pituitary and epiphysis glands.
3. Microscopic structure of the thyroid and parathyroid glands.
4. Histological structure of the adrenal gland.
5. Diffuse endocrine system. Study of the pancreatic islets.

15. Respiratory and Urogenital systems.

1. General structure of the respiratory system.
2. Upper airways. Paranasal sinuses.
3. Lower airways. Alveoli.
4. Histological structure of the renal parenchyma. Nephron concept. Structural components of the renal glomerulus.
5. Uriniferous tubules and collecting ducts of the kidney. Urinary tract.
6. Structure of the female reproductive system.
7. Structure of the male reproductive system.

16. Digestive system I. General structure. Regions of the digestive tract. Accessory glands.

1. General structure of the digestive tract.
2. Histological structure of the esophagus.
3. Structural analysis of the stomach.
4. Microscopic structure of the intestine and its different regions.
5. Liver gland.
6. Pancreatic gland.

17. Digestive II: salivary glands.

1. Generalities and classification of the salivary glands: by size, by the type of the secretion product.
2. General histological organization of the salivary glands. Study of the stroma. Study of the parenchyma: secretory portion and ducts portion.
3. Parotid gland.
4. Submaxillary or submandibular gland.
5. Sublingual gland.
6. Minor glands.

18. Digestive III: stomatognathic system, oral cavity. Oral mucosa I.

1. Stomatognathic system, components. Oral cavity.
2. Concept of oral mucosa and structural components: epithelium, basement membrane and chorion or lamina propria.
3. Concept of non-keratinized, orthokeratinized and parakeratinized stratified squamous epithelium.
4. Types of oral mucosa: lining, masticatory and specialized.
5. Structural characteristics of the lining mucosa epithelium: keratinocytes and non-keratinocytic cells.
6. Connective tissue: lamina propria or chorion, epithelial ridges and connective tissue papillae; submucosa: connective tissue and minor salivary glands.
7. Lip, differential structure of the different regions: skin of the lip, transition zone and mucosa of the inner face of the lip.
8. Cheeks, differential structure of the different regions: maxillary area and mandibular area.

19. and 20. Oral mucosa II and III: masticatory and specialized.

1. General characteristics of the masticatory mucosa: functions, location, and macroscopic appearance.
2. Characteristics of the epithelium: layers of keratinocytes, and non-keratinocytic cells.
3. Lamina propria or chorion: epithelial ridges and connective tissue papillae.
4. Specific structure of the different regions: hard palate, free and attached gingiva.
5. Structural components of the tongue: mucosa, chorion, muscle, and minor salivary glands.
6. Topographic variations: ventral and dorsal area.
7. Mucosa of the dorsal surface and study of the lingual papillae: filiform, fungiform, foliate and circumvallate papillae.
8. Taste buds: general structure, cytology (support cells, and neurosensory or taste cells) and innervation.

21. and 22. General pattern of human dentition, tooth structure and periodontium, study of general and oral histogenesis. Coronary and radicular odontogenesis.

1. Human dentition: types of dentition and general structural pattern of the tooth and the periodontium.
2. Concepts, factors, and regulatory mechanisms of embryonic development.
3. Sequential development of the embryo of dental interest.
4. Embryological origin of the dental tissues.
5. Phases of the odontogenesis: morphogenesis and histogenesis.
6. Morphogenesis: dental lamina, bud or bud stage, cap stage (initial and advanced), bell stage (initial and advanced) and appositional stage.
7. Root odontogenesis: development and root pattern, formation of the dentin, cementum and periodontal ligament.

23. and 24. Enamel and amelogenesis. Investing layers of the tooth.

1. Physical properties and chemical composition: inorganic and organic components.
2. Basic structural units of enamel: prisms or rods (EBSUs).
3. Secondary structural units of enamel: striae of Retzius, enamel lamellae, tufts, and spindles, Hunter-Schroeder bands, gnarled enamel, and aprismatic enamel.
4. Stages of amelogenesis and participating cells: morphogenic-preameloblasts, organization-young ameloblasts, differentiation-secretory ameloblasts, and secretory formative-secretory mature ameloblasts.
5. Maturation of enamel and related structures: absorptive ameloblasts and reduced dental epithelium.
6. Embryological covers: reduced dental epithelium, coronal cementum and dental cuticle.
7. Acquired layers: salivary film, bacterial plaque and tartar/calculus.

25. and 26. Dentin-pulp complex: structure of the pulp and dentin.

1. Concept, general structure, and functionalism of the pulp.
2. Pulp zones: central and peripheral or marginal pulp.
3. Pulp vascularization: blood and lymphatic.
4. Pulp innervation and dentin sensitivity.
5. Dentin: physical properties and chemical composition (inorganic and organic components).
6. Main structural characters of dentin: matrix and dentin tubules.
7. Secondary structural characteristics of dentin: incremental lines, interglobular dentin or Czermak spaces, Tomes granular layer, Schereger's dentin bands, amelodentinal junction, and cementum-dentin junction.

27. Formation and maturation of the dentin-pulp complex.

1. Definition and chronology of dentinogenesis.
2. Life cycle of the odontoblasts: ectomesenchymal cells, preodontoblasts, and young, secretory and mature odontoblasts.
3. Histogenetic classification of dentin: primary dentin, secondary dentin and tertiary dentin.
4. Coronal dentinogenesis: mantle and circumpulpal coronal dentin.
5. Root dentinogenesis: mantle and circumpulpal radicular dentin.

28. and 29. Insertion periodontium: study of the cementum, periodontal ligament, and alveolar bone.

1. General characteristics and components of the insertion periodontium. Specificities of cementum.
2. Structural components: cells (cementoblasts, cemenocytes, and cementoclasts) and matrix.
3. Criteria for cementum classification: topographic, presence of cells, and type of fibers.
4. Cementogenesis: formation of the cervical loop and epithelial-mesenchymal interaction.
5. Periodontal ligament. Composition: cells and intercellular matrix.
6. Bundles of the periodontal ligament: transseptal, of the alveolar crest, horizontal, oblique, apical, and interradicular.
7. Basal bone and alveolar bone.

8. Macroscopic structure of the alveolar crest, the buccal and lingual tables, the interdental septum, the interradicular septum, and the interradicular bone.
9. Microscopic structure of the compact and cancellous bone of the alveolar bone.
10. Ossification, modeling and remodeling of the alveolar bone. Tooth movements.

30. Protection periodontium. Components. Study of the marginal periodontium and the epithelial junction.

1. Generalities. Gingival unit.
2. Gingiva: common alveolar oral mucosa, fixed or attached gingiva, and free or marginal gingiva.
3. Dentogingival junction: sulcus epithelium (sulcular/crevicular), and junctional epithelium.
4. Gingival ligament: dentogingival, gingivoperiosteal, dentoperiosteal, gingivoalveolar, circular, and alveolar crest fibers.

31. Comparative structure of primary and permanent teeth. Age-related dental and oral modifications.

1. Structural modifications of the primary and secondary teeth.
2. Age-related modifications of the dental tissues.
3. Age-related modifications of the periodontal and surrounding tissues.

32. Formation, renewal and aging of tissues. Tissue engineering.

1. Mechanisms of tissue formation, renewal and aging.
2. To repair and regenerate.
3. Tissue engineering.

33. Five sessions of diagnostic seminars (two hours long)

Students will be provided, in the virtual classroom, different histological images for their analysis. They will be assigned, and each student will present the result of the diagnosis made to his/her classmates, in some of the five two-hour sessions.

34. Laboratory practice 1. Epithelial tissue.

We will start the microscopy practices with the study of different preparations for the observation of various types of lining and glandular epithelia.
Objectives: simple epithelium, keratinized stratified epithelium, pseudostratified epithelium, unicellular mucous gland, serous gland, simple tubular coiled gland, and branched holocrine gland.

35. Laboratory practice 2. Connective and muscular tissues.

In this practice, the microscopy study of proper connective tissue and fat will be carried out. Microscopic analysis of the ossification process. Visualization of muscle tissue.
Objectives: proper connective tissue and ectomesenchyme, unilocular and multilocular fat, intramembranous ossification, cell types of bone and optical structure of skeletal muscle.

36. Laboratory practice 3. Circulatory system. Central and peripheral nervous tissue.

In this practical session the microscopic study of blood vessels, the cerebellar lamella, and the peripheral nerve is proposed.
Objectives: intima, media and adventitia layers of the vessels, organization of neurons and glia cells in the cerebellar cortex, and in the peripheral nerve.

37. Laboratory practice 4. Salivary glands and tonsil.

The analysis of these preparations will facilitate to the students the microscopic identification of the common and differential patterns of the salivary glands, as well as the structure of the lingual tonsil.
Objective: glandular parenchyma and stroma, serous, mucous, mixed glands, intra and extra-lobular ducts, epithelial and lymphoid tissues of the tonsil.

38. Laboratory practice 5. Common and specialized oral mucosa.

The study that is proposed to be carried out in the preparations of this practice is the lining of the different oral surfaces, specifically the lip and the tongue.
Objectives: lip skin and lining oral mucosa, transition zone, tongue components, minor salivary glands, and lingual papillae.

39. Laboratory practice 6. Odontogenesis.

In this practical session, the study of various preparations of a maxilla during embryonic development will be considered.
Objectives: structural characteristics of the different stages of coronal odontogenesis and surrounding structures.

40. Laboratory practice 7. Mineralized tooth structures.

During this practical session, ground longitudinal and transverse sections of teeth will be studied.
Objectives: enamel prisms and their variations, amelodentinal junction, dentin with its structural variations, cellular and acellular cementum.

41. Laboratory practice 8. Demineralized dental structures. Periodontium.

Tooth preparations after demineralization, and the tissues of the insertion periodontium will be visualized.
Objectives: pulp-dentin complex, gingival and periodontal ligaments, cementum, and alveolar bone.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	33,00	100
Laboratory practices	15,00	100
Classroom practices	12,00	100
Development of individual work	10,00	0
Preparation of evaluation activities	10,00	0
Preparing lectures	45,00	0
Preparation of practical classes and problem	25,00	0
TOTAL	**150,00**	

TEACHING METHODOLOGY

In the face-to-face theoretical classes, the teacher will present the contents, methods and techniques for the development of the knowledge and skills that the students have to acquire. They consist of the teacher presenting a topic for 50-55 minutes. Through these classes, information, both verbal and iconographic, is provided to a large number of students, saving time and resources, emphasizing the important aspects of the topic and delving into the concepts that are most difficult to assimilate. Furthermore, in our discipline we can take advantage of the projection of histological images to try to get them to describe the images themselves, thus facilitating their active participation. In order to facilitate the monitoring of the discourse during class, the teacher can provide the students with a summary of the class, which is deposited in the virtual classroom prior to class.

Within the practical teaching, various activities are carried out in this subject: microscopy practices and analysis (diagnosis) of histological images.

Microscopy practices constitute a first-rate teaching element in our discipline since they allow autonomous, although supervised, personal observation of tissues and organs using the microscope. Microscopic practices are supervised by several teachers, which allows a more personalized and fluid teacher-student relationship. Each student has a microscope and a tray with the preparations that will be studied in each practice. The teacher observes with the microscope the same preparation that the students are going to observe, projecting images of it and explaining the characteristics and objectives of each histological preparation, with practical advice on how to approach it. On a voluntary (but evaluable) basis, students prepare a personal control of practices daily, where they reflect what they observed, thinking about the usefulness of the activity itself and the possible future use that they can make of this practice notebook as a complement to the classes. theoretical.

The diagnostic seminar practices are based on the presentation by each student of the result of their study of the histological slides that are assigned at the beginning of the course. The students are the speakers and therefore the active actors in the exchange of knowledge and, where appropriate, the discussion of what is shown, always trying to stimulate participation and criticism. This practical activity promotes self-learning as well as the ability to critically search for verified information and communication skills and defense of ideas. They are supervised and guided by the teacher, but it is the students who have the initiative.

The gender perspective, respect for diversity and the sustainable development goals (SDGs) will be incorporated into teaching, whenever possible.

EVALUATION

Theoretical evaluation

It will mean 70% of the final grade. It will be carried out through a written test that will include the contents of the theoretical program and will aim to evaluate the acquisition of knowledge:

• 6 points: 60 multiple choice questions (4 answers, 1 true/3 false).

Grading criteria: 0.1 point/correct question; 0.033 points are subtracted per question answered incorrectly.

• 1 point: An essay question of limited length.

To pass, a score of 3.5 is required in the theoretical part.

Practical evaluation

It will mean 30% of the final grade. It will be carried out through continuous evaluation in the different activities. The acquisition of skills related to general and specific competencies will be evaluated according to the following maximum scores:

• 0.80 points: individual assessment of the exposition of the diagnosis made on the proposed microscopic slides.

• 0.7 points: continued diagnosis of microscopic slides.

• 0.80 points: preparation of a laboratory notebook.

• 0.7 points: continued diagnosis of images of microscopic preparations. l

To pass the practices through continuous evaluation of the activity developed, it will be necessary to achieve 2 points. If it is not carried out or is suspended, the students will have to take a practical exam of the preparations and sheets worked on throughout the academic year.

Attendance at practical activities is mandatory. The student is considered to meet this requirement if he or she has attended a minimum of 80% of these activities and has adequately justified the impossibility of attending the remaining sessions due to the occurrence of a cause of force majeure. It will be essential to comply with this requirement to pass the subject.

Students are reminded of the importance of carrying out evaluation surveys to all teaching staff of the degree subjects.

REFERENCES

Basic

- Histología especial

  - GÓMEZ DE FERRARIS, CAMPOS, SÁNCHEZ Y RODRÍGUEZ. Histología, Embriología e Ingeniería Tisular bucodental. Ed. Médica Panamericana (2024, 5ª edición).
  - NANCI. Ten Cates Oral Histology: development, structure, and function. Ed. Elsevier-Mosby (2013, 8ª edición).
  - BERKOVITZ B. K. B., HOLLAND G. R., MOXHAM, B. J. Oral anatomy, histology and embriology. Editorial Mosby Elsevier (2009, 4ª edición).

- Histología general

  - BRÜEL, CHRISTENSEN, TRANUM-JENSEN, QVORTRUP y GENESER. Geneser Histología Ed. Médica Panamericana, (2015, 4ª edición).
  - KIERSZENBAUM y TRES. Histología y Biología Celular. Introducción a la anatomía patológica. Ed. Elsevier España S.L. (2016, 4ª edición).
  - ROSS MH y PAWLINA W. Histología. Texto y atlas color con Biología Celular y Molecular. Editorial Médica Panamericana (2020, 8ª edición).

- RECURSOS e-Salut:
  - ClinicalKey Student Medicina, Odontologia y Enfermería [https://uv-es.libguides.com/RecursosSalut]
  - Acces Medicina [https://uv-es.libguides.com/Access_Medicina]
  - Médica Panamericana [https://uv-es.libguides.com/Medica_Panamericana]

Additional

- Histología general

  - EYNARD, VALENTI y ROVASIO.Histología y embriología del ser humano. Ed. Médica Panamericana. (2016, 5ª edición)
  - GARTNER, HIATT y STURM. Temas Clave: Biología e Histología Celular. Ed. Lippincott Williams &Wilkins (2007, 5ª edición).
  - JUNQUEIRA y CARNEIRO. Histología básica. Texto y atlas. Ed. Elsevier-Masson (2015, 12ª edición).
  - KÜHNEL. Atlas color de Citología e Histología. Ed. Médica Panamericana (2005, 11ª edición).
  - STEVENS -LOWE. Histología humana. Ed. Elsevier España (2015, 4ª edición).
  - WELSCH. Sobotta Histología. Ed. Médica Panamericana (2014, 3ª edición).

- Histología especial

  - ACTIS. Sistema estomatognático: bases morfofuncionales aplicadas a la clínica. Ed. Médica Panamericana. (2014).
  - AVERY. Principios de Histología y Embriología bucal con orientación clínica. Ed.Elsevier-Mosby(2007,3ªedición).
  - CHIEGO. Principios de histología y embriología bucal: con orientación clínica. Ed. Elsevier (2014).
  - GARANT. Oral cells and tissues. Ed. Quintessence (2003).
  - HAND-FRANK. Fundamentals of Oral Histology and Physiology. Ed. Wiley Blacwell (2016).
  - KUMAR. Orban's Oral Histology & Embryology. Kindle Edition.Ed. Elsevier (2014).

- YOUNG B, O'DOWD G, WOODFORD P. Wheater Histología Funcional. Texto y Atlas en Color Elservier (2014).

- Webs
  http://www.histologyguide.com/
  http://histology.medicine.umich.edu/
  http://www.drjastrow.de/WAI/EM/EMAtlas.html
  http://www.facmed.unam.mx/deptos/biocetis/atlas2013A/
  https://www.histologia.uchile.cl/atlas/atlasodontologia.html
  http://wzar.unizar.es/acad/histologia/
  https://mmegias.webs.uvigo.es/
  http://www.ujaen.es/investiga/atlas/
  https://www.proteinatlas.org/