



- 1- Describe the histological structure of the swim bladder.
- 2- Explain the histological functional structural relationship of the testis of catfish.
- 3- Compare between the crop and gizzard.
- 4- What do you know about esophagus of poultry.
- 5- Draw only with complete data on your drawing the following:-
 - 1- Corpus of stannus.
 - 2- Thymus of poultry.
 - 3- Magnum.
 - 4- Intestine of chicken.

With Best Wishes
Prof. Dr: Ehab M. EL-Zoghby
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6- Describe the histological structure of the swim bladder.

The swim bladder is classified as digestive organ in some species, where it classified as respiratory organ in other species.

The histology of the swim bladder is extremely variable between species but, nevertheless, very important clinically. In some fishes, the swim bladder has essentially the same histology as its origin, the digestive tract. In other fishes, the anatomy of the swim bladder is greatly reduced. There may be no more than an inner mucous membrane layer with a thin outer connective tissue covering.

In sturgeon, pepsin-secreting and mucus-secreting glands are still found in the swim bladder, which has all of the components of a digestive viscus. Most species have swim bladders covered with a simple squamous epithelium over a layer of dense fibrous connective tissue with longitudinal, circular, and oblique fibers arranged in layers. Guanine crystals, shaped like thin platelets embedded in this connective tissue, give the swim bladder of some species a distinctive silver color. The outer layers of connective tissue are joined to the inner layers of the structure by a loose, elastic, connective tissue layer. The inner epithelium of the swim bladder is commonly cuboidal and may be ciliated, partially ciliated, or completely devoid of cilia. The epithelial layer can include pigment cells. It is supported by a muscularis of smooth muscle in most fishes.

Rainbow trout have a thin muscularis of smooth muscle with many elastic fibers arranged with the outer layer of fibers running longitudinally and inner fibers circumferentially. Perch have a thin-walled swim bladder covered with a peritoneum containing numerous melanocytes. Underneath is a fibrous tunic that covers an inner layer of circular connective tissue fibers. The only evidence of a muscularis is in the region of the oval or gas gland. Some groups of the catfish and loach families have their swim bladder protected within a bony capsule derived from the vertebrae.

The gas gland (oval, red gland, red body) varies widely in shape and form. It is often oval or round but can be a torus or stellate or dendriform. It can occupy a small or large percentage of the swim bladder wall. The gas gland is a highly vascular organ that usually consists of parallel venous and arterial rete mirabile arranged in a counter-current fashion. There are many versions of these glands in different species. In the codfish and the stickleback, only a single pair of retia is formed between the venules and arterioles of the gland. As many as three sets of retia can occur in other species, with retia forming at the capillary, venule/arteriole, and vein/ artery levels.

It consists of:-

Simple sq. epith (s.cuboidal or columnar and pigmented)

Dense fibrous CT

Three directions of smooth muscles

Guanine crystals (thin elements present in the CT giving the fish its silver appearance)

7- Explain the histological functional structural relationship of the testis of catfish.

It may be small mass of testicular tissue to large mass

It has the same structure as that of the mammals (stroma and parenchyma).

The stroma are consists of tunica albuginea, septa and the interstitial while the **Parenchyma** is consists of seminephrous tubules and interstitial cells.

Seminiferous tubules:

It lined by (sequence of spermatogenic cells and sertoli cells as that of the mammals).

Sertoli cells are appeared large wedged shape and eccentric irregular nuclei.

Sertoli cells form cysts that enclose the spermatogenic cells).

Spermatogonium → spermatocytes → spermatid → spermatozoa

Interstitial cells of leydig are similar to that of the mammals which is responsible for androgen secretion.

The cat fish has special structure in which the testis consists of anterior and posterior portion

The anterior portion is similar to that of the mammals while the posterior portion is composed of branched coiled tubules lined by simple columnar epithelium with no sertoli, spermatogenic and leydig cells.

The columnar cells are characterized by apically located nuclei and lightly stained cytoplasm.

8- Compare between the crop and gizzard.

The crop has a resident bacterial population, mostly *Liaczobacillus* species, which ferment some carbohydrates in his food for their own purposes. Lactic acid is the by-product of ibis fermentation so the pH of the feed drops as the food is icezried in the crop. Geese and ducks do not have a true crop but have an enlarged part of the lower esophagus. This gives waterfowl a similar ability to store food but bacterial fermentation is less compared to other poultry

It is non-glandular caudal diverticulum situated two-thirds of the way down the esophagus. In the pigeon two lateral glomerular sacs secrete crop milk.

The thickness of crop lining epithelium increased and was thicker than of the esophagus and had some keratinization.

The lamina propria had some collagen fibers .At the esophageal-crop junction; the crop had no mucus glands. The esophageal glands at the junction ended abruptly but all other layers were continuous through the crop.

Ventriculus (or) Gizzard (or) muscular stomach.

held for a longer time in the gizzard, so most of the Depsiri-catalysed protein hydrolysis occurs in this part of the ±ge>:ive tract. The gizzard is a flattened sphere surrounded by powerful muscles that generate high pressures within. Muscular contractions can physically break up very dense food particles such as whole cereal grains. Particles of grit are retained in the gizzard and they provide an abrasive surface that

•0 helps in grinding the food. The submucosa of the gizzard secretes a protein— polysaccharide substance called koilin. The koilin solidifies into short rods when it reaches the acid conditions in the gizzard and the rods cross-link to form a —esh around the gizzard wall. This protects the wall from damage and provides an abrasive surface for the grinding process.

The luminal surface is lined with secretory product of the mucosal glands, which solidifies at the surface to form a hard cuticle of koilin.

Lamina Epith.

It is formed from one layer of simple columnar epithelium secretory types

Lamina propria:

It consists of layer of loose connective tissue containing branched and unbranched tubular glands which lined by cuboidal to low columnar cells (chief cells and basal cells)

rartl

also have low amount of endocrine cells but not open into the luminal of the gland but face to the blood capillary.

Lamina muscularis mucosa:

IT IS ABSENT IN GIZZARD.

Tunica submucosa:

It is loose connective tissue fused with lamina propria.

Tunica muscularis **mucosae**:

It formed the main bulk of the gizzard. It is smooth muscle form three layer in different direction which ranged from oblique to circular and longitudinal, these itire layer were connected by collagen fiber in between.

Tunica serosa

It is subserosal layer which is fibrous connective tissue and covered by mesothelium. The gizzard covered externally by tendinous layer.

9- What do you know about esophagus of poultry.

Tunica mucosa of the esophagus was thrown into numerous longitudinal folds, variable in length The mucosal epithelium was a thick stratified squamous type non keratinized or incompletely kertinizied. The lining epithelium rested on a well-developed basement membrane.

The lamina propria was composed of connective tissue and rich in blood vessels, many collagen fibers and reticular fibers. It was, however, characterized by lack of elastic fibers and lymphoid tissue. Large simple branched alveolar mucus glands were present. A tall columnar epithelium, whose cells contained flattened or oval basally situated nuclei, lined the mucus glands. This lining decreased to a cuboidal shape as it approached the surface.

The esophageal glands were mucus in nature,

The esophageal glands opened directly onto the surface epithelium through narrow clefts.

The muscularis mucosa was composed of thick bundles of smooth muscle arranged longitudinally.

The muscularis mucosae followed the folds of the mucus membrane.

The tunica submucosa was thin; it was hardly visible in some places, while in others^it widened out and to include substantial amounts of fibrous connective tissue. Blood vessels and nerves could be distinguished in it.

The tunica muscularis had two layers thin outer longitudinal layer, and a thick inner circular layer.

A small amount of connective tissue was present between these layers.

The tunica adventitia was thin and formed from white fibrous connective tissue.

Lymphoid tissue accumulates in the caudal esophagus as the esophageal tonsil.

10- Draw only with complete data on your drawing the following:-

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