

Digestive Glands in Vertebrates ①

Several digestive glands are associated with the alimentary canal and they secrete several juices which help in the digestion of food. In the absence of these glands, the alimentary canal would have simply acted as a conducting pipe. These glands include-

(1) Glands of Oral and Buccal cavity:

These multicellular glands first appeared in land vertebrates to moisten the dry food with their secretions (mucous) for easy swallowing of food. In higher forms, these glands become specialized for capturing the prey, digestion of food and defence.

(a) Cyclostomes: Cyclostomes consist of a pair of buccal or oral glands which open under the tongue. These glands secrete an anticoagulant called lampbrushin (in lampreys) that prevents the clotting of the blood of the prey during feeding.

(b) Fishes: Fishes do not have oral glands instead solitary mucous secreting cells are present in the epithelium of the buccal cavity that secretes mucous to moisten food.

(c) Amphibians: In Amphibians, that spend most of the life in water also have solitary mucus secreting cells like fishes in the buccal cavity to moisten food. Terrestrial amphibians have an intermaxillary (internasal) gland in the septum between premaxillae and nasal capsules. It discharges sticky mucous (secretions) that covers their tongues and makes the tongues adhesive. These glands are larger in anurans than urodels. It is absent in caecilians. Frogs, toads and some Salamanders have numerous lingual glands on their protrusible tongue. Mucous secreted by these glands also makes the tongue sticky to aid in capturing

the prey. The buccal glands in some frogs are also known to secrete a digestive enzyme ptyalin. (2)

(d) Reptiles: Reptiles have a palatine gland which is homologous to the intermaxillary gland of amphibians and secretes a sticky mucus. This covers the tongue and helps many lizards like Chamaeleon to capture their prey. Reptiles also have lingual, sublingual and labial glands. All these glands secrete mucus. In poisonous snakes, the labial glands of the upper jaw are modified into poison glands to secrete poison. Chelonians and Crocodilians have poorly developed oral glands. In Gila monster (poisonous lizard) the sublingual glands are modified into poison glands. Their ducts lead into the grooves of the lower front teeth. [Gila monsters do not inject poison like snakes instead they latch onto the victim and chew it to allow the poison to move through grooves in their teeth and then into the open wound.

Birds: Birds have median, anterior and posterior sublingual glands which discharge or open on the floor of the buccal cavity. They also have paired angle glands that open at the angles of the mouth. Many groups of small glands open separately on the buccal roof. All these oral glands of most of the birds produce mucus that softens the food. But, in some birds especially the grain eating birds like pigeons etc, the digestive enzyme ptyalin is also produced. Although ptyalin is present but ^{very} little digestion can occur in mouth and food quickly passes through the oesophagus into the crop, where the starch digestion occurs in the crop by the ptyalin that originated in the mouth and got mixed with the food and also by the ptyalin that was produced by the bacteria like Lactobacillus and Streptococcus residing in the crop.

Mammals: Mammals have many small mucous glands on the palate and tongue that secrete mucus. For the 1st time in vertebrates usually 3 pairs of large true salivary glands are present which includes: parotid glands, submandibular or submaxillary glands and sublingual glands. The parotid glands lie below and a little in front of the external auditory meatus. Their ducts open into the vestibule behind the upper incisors. The submaxillary or submandibular glands lie in the posterior region of the lower jaw. Their ducts discharge in front of the tongue near the lower incisors. The sublingual glands lie under the tongue. Their ducts open into the anterior part of the buccal floor. In rabbit, additional salivary gland (4th pair) are present called Infra-orbital that are present below the orbit and these ducts open near the upper molars. In whales, the salivary glands have secondarily become reduced.

The salivary glands are composed of numerous secretory lobules, the acini or alveoli, opening into the ducts. They secrete an alkaline fluid, the saliva, which contain water, salts, mucin and an enzyme ptyalin. The enzyme breaks starch into sugar maltose in alkaline medium. Secretion of saliva is under nervous control.

Salivation is activated by the sight-smell, thought, talk and by presence of food in the buccal cavity

