

Unit 6

The Digestive System

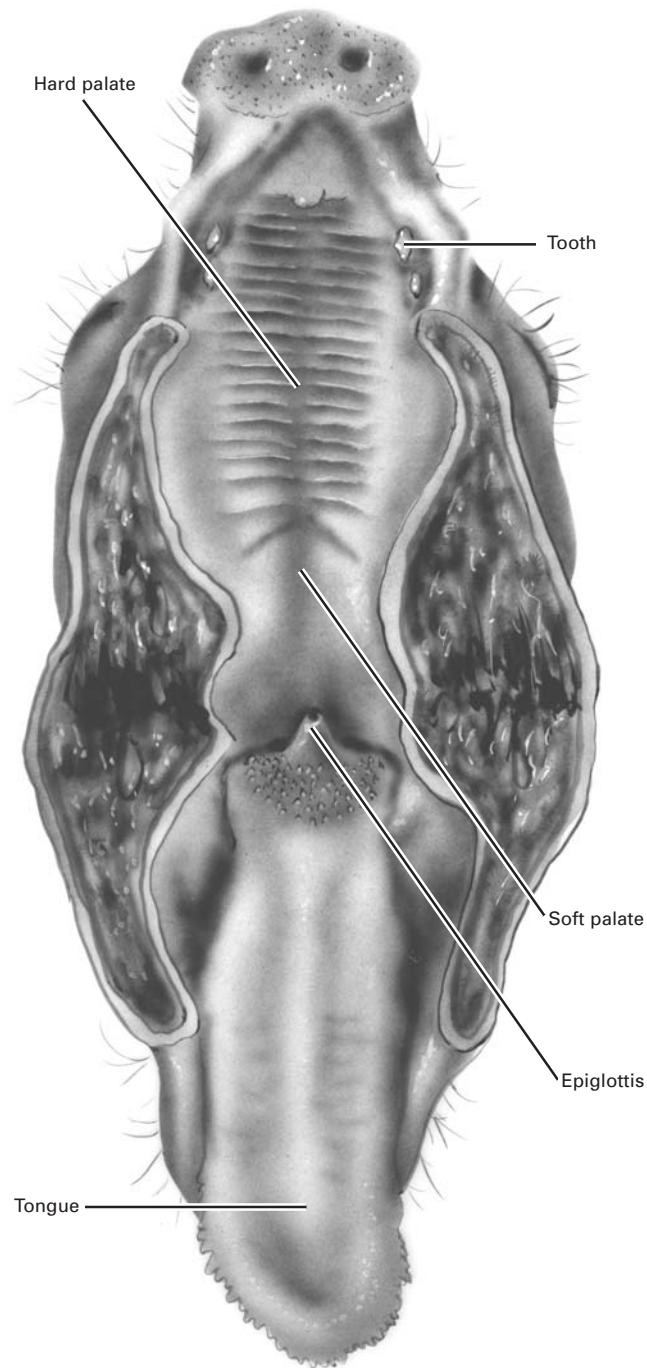


Figure 23. Dissection of the mouth.

Digestion and the digestive system begin in the mouth (Fig. 23). Open the mouth and cut through the jaws on either side at their joints. (Refer to a skull to see where the jaws articulate with the skull.) When food enters the mouth, it is torn and broken by the *teeth*. *Saliva* aids in lubricating the food and contains digestive enzymes that start to break down complex molecules into simple ones that can be absorbed later in the digestive tract. Food is prevented from entering the nasal cavity by the *hard* and *soft palates*. Breathing is interrupted only for a brief instant to allow food to pass from the mouth to the esophagus. As this happens, the *epiglottis* is flapped back over the trachea, and muscles of the throat push the food into the esophagus. Locate the epiglottis and push it back to see how it works. Food is swallowed and passed to the stomach through the *esophagus*. As mentioned earlier, the esophagus passes through the thoracic cavity behind the trachea and attaches to the stomach.

The largest organ in the abdominal cavity is the *liver* (Fig. 24). The liver is found in the upper abdomen immediately posterior to the diaphragm. Locate the four primary lobes of the liver: the *left lateral*, on the pig's left side, covering the stomach; the *left medial*, immediately adjacent to the left lateral lobe; and the *right medial*, adjacent to the left medial lobe and lying next to the body wall. Lift the liver and turn it to the pig's left to see the *right lateral* lobe.

The liver is a highly vascular structure. Remove the tip of the left medial lobe and examine it with a hand lens. Part of the blood supply to the liver is a system of veins known as the *portal system*. In the portal circulation, blood from the digestive organs, the stomach, and both large and small intestines enters the liver through the *portal vein*; this can be identified if the liver is lifted. The portal vein branches repeatedly into smaller and smaller vessels that finally feed into tiny vessels called capillaries. The capillaries come back together to form *hepatic veins* that then join the *postcaval vein*, which returns the blood to the heart. This system of veins-capillaries-veins

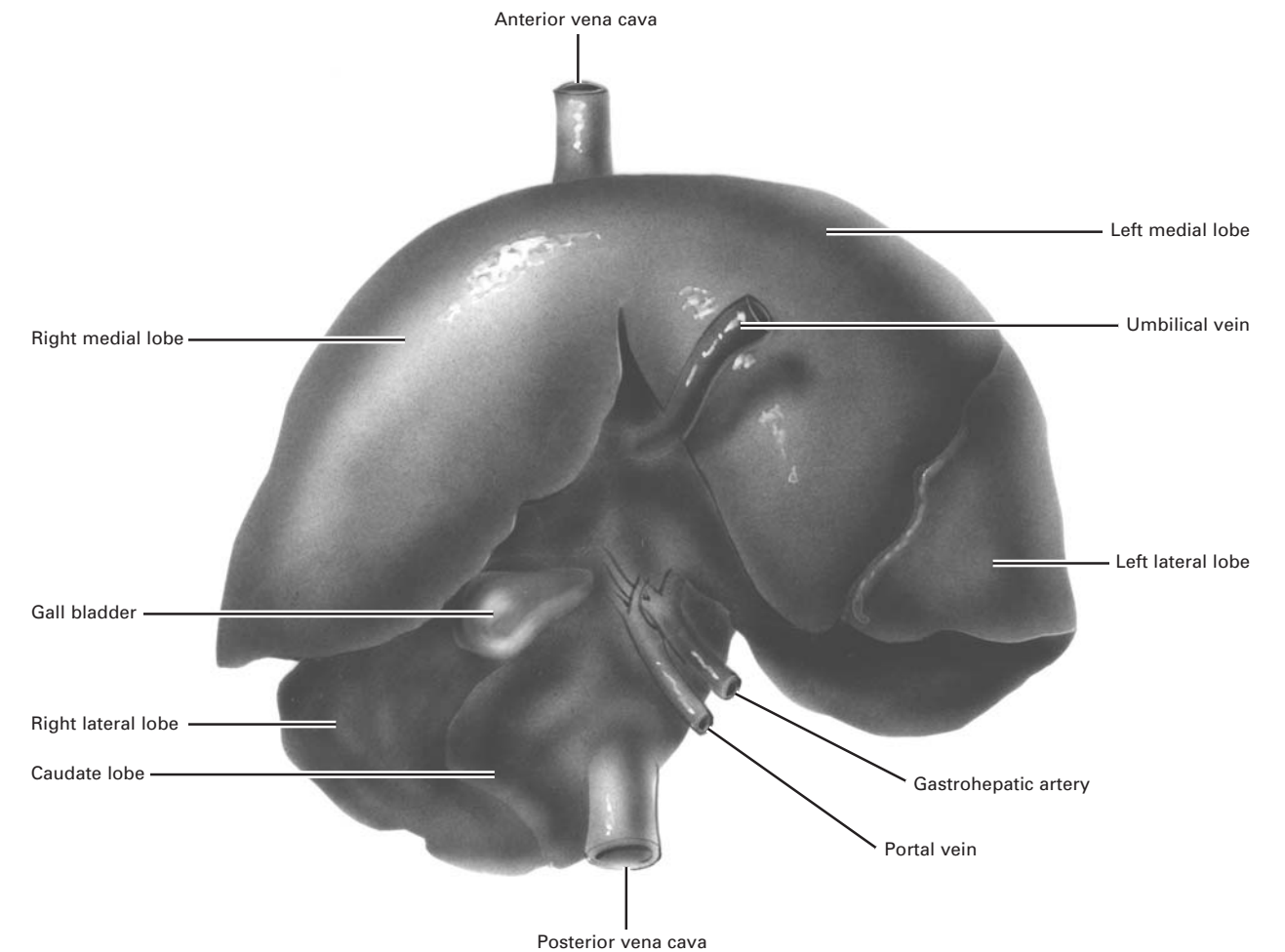


Figure 24. View of the liver and gall bladder removed from the body cavity.

enables the cells of the liver to perform many of their functions.

Located in a depression on the dorsal surface of the *right* medial lobe is the *gall bladder*, a small, sac-like structure. The gall bladder, which appears as a green sac in the adult, serves as a storage organ for bile, the digestive juice that is produced by the liver and that emulsifies fat. Emerging from one end of the gall bladder is the *cystic duct*, which serves as the passageway for bile. The cystic duct joins the *hepatic duct* as it emerges from the liver. Together they form the *common bile duct*, which carries bile to the small intestine.

The liver has other functions besides digestion. It filters out and breaks down the toxins ingested or produced during protein metabolism and produces, stores, and releases glycogen, a carbohydrate used by muscles as a source of energy. The liver is also a major storage site for nutrients. Remove the liver by cutting the postcaval vein,

the portal vein, the common bile duct, and the connective tissue holding the liver. Be careful not to cut through the esophagus leading to the stomach.

When you remove the liver, you will see the *stomach* lying in the upper, left side of the abdomen (Fig. 25a). Glands in the lining of the stomach produce and secrete digestive juices, principally hydrochloric acid and pepsin, which are involved in breaking down food. Food first enters the stomach in the *cardiac region* (Fig. 25b). At the junction of the stomach and the esophagus is a ring of muscle, the *cardiac sphincter*. This contracts to prevent food from passing back up the esophagus. The stomach is a large, bean-shaped, muscular, sac-like organ. The wall of the stomach is composed of a lining that produces the digestive juices, surrounded by three layers of muscle. Each layer is oriented in a different direction: the outer layer runs longitudinally, the middle layer is circular, and the