22.9C: Histology of the Pancreas

The pancreas serves digestive and endocrine functions, and it is composed of two types of tissue: islets of Langerhans and acini.

Learning Objectives

- Describe the histology of the pancreas

Key Points

- Under a microscope, the stained sections of the pancreas reveal two different types of parenchymal tissue.
- The light-stained clusters of cells are called islets of Langerhans. These produce hormones that underlie the endocrine functions of the pancreas.
- The dark-stained cells form acini that are connected to ducts. Acinar cells belong to the exocrine pancreas and secrete digestive enzymes into the gut via a system of ducts.

Key Terms

- **islets of Langerhans**: Regions in the pancreas that contain its endocrine cells.
- **acini**: An acinus (adjective: acinar; plural: acini) refers to any cluster of cells that resembles a many-lobed berry, such as a raspberry (acinus is Latin for berry).

The pancreas is a glandular organ in the digestive system and endocrine system of vertebrates. It is both an endocrine gland that produces several important hormones—including insulin, glucagon, somatostatin, and pancreatic...
polypeptide—as well as a digestive organ that secretes pancreatic juice that contain digestive enzymes to assist the absorption of nutrients and digestion in the small intestine. These enzymes also help to further break down the carbohydrates, proteins, and lipids in the chyme.

Anatomy of the Pancreas

Under a microscope, stained sections of the pancreas reveal two different types of parenchymal tissue. Light-stained clusters of cells are called islets of Langerhans. These produce hormones that underlie the endocrine functions of the pancreas.

The dark-stained cells form acini that are connected to ducts. Acinar cells belong to the exocrine pancreas and secrete digestive enzymes into the gut via a system of ducts.

The pancreas is a dual-function gland that has the features of endocrine and exocrine glands.

The part of the pancreas with endocrine function is made up of approximately a million cell clusters called islets of Langerhans. Four main cell types exist in the islets. They are relatively difficult to distinguish using standard staining techniques, but they can be classified by their secretion

1. α cells secrete glucagon (increase glucose in blood).
2. β cells secrete insulin (decrease glucose in blood).
3. Delta cells secrete somatostatin (regulates/stops α and β cells).
4. PP cells or gamma cells, secrete pancreatic polypeptide.

The islets are a compact collection of endocrine cells arranged in clusters and cords and are crisscrossed by a dense network of capillaries. The capillaries of the islets are lined by layers of endocrine cells in direct contact with vessels, and most endocrine cells are in direct contact with blood vessels, either by cytoplasmic processes or by direct apposition.