

Location

The pancreas is a long gland that sits behind the stomach and under the liver. It is about 25 cm long and is connected to the duodenum (the first part of the small intestine) by a small duct.

Functions/Roles

The pancreas is an endocrine and exocrine gland. An exocrine gland is an organ that makes and releases chemicals into ducts, rather than into the blood stream like endocrine glands.

As an endocrine gland, the main function of the pancreas is to make hormones that control blood sugar levels. These hormones are made in clusters of cells called 'islets of Langerhans'.

Keeping blood sugar levels stable is important to provide a constant energy supply to the body. Low blood sugar levels can cause sweating, shaking, mood changes, confusion and in severe cases, seizures and loss of consciousness. Persistently high blood sugar levels are a feature of diabetes mellitus.



The remaining area of the pancreas has exocrine functions, producing chemicals (enzymes) that help digest food. These enzymes are transported through a small duct from the pancreas to the small intestine. These enzymes help break down proteins, carbohydrates and fats in food.

Hormones produced by the pancreas

Insulin prevents blood sugar (glucose) levels from getting too high. It signals cells in fat, muscles and the liver to start absorbing and storing glucose. The stored glucose can be used to provide the body with energy when needed. Because glucose moves out of the blood, the level of sugar in the blood decreases.

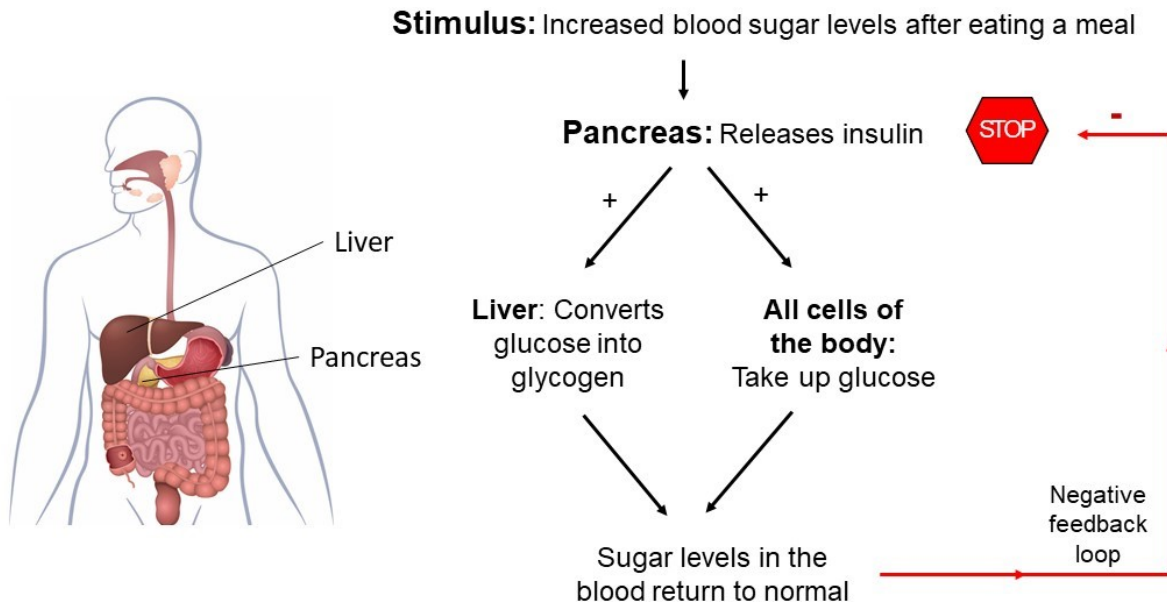
Glucagon prevents blood sugar (glucose) levels from dropping too low. It does this in two main ways. Glucagon signals fat and muscle cells to release their stores of glucose, and it signals the liver to start making glucose from its storage of starch and glycogen. This results in more glucose entering the blood stream, meaning blood sugar levels rise.

Somatostatin is released from specialised cells (delta cells) of the pancreas when other pancreatic hormone levels get too high. This helps keep blood sugar levels in check. Somatostatin also regulates the release of hormones in the gastrointestinal (digestive) system.

Vasoactive intestinal peptide (VIP) is released from many tissues, including the pancreas, brain, immune cells and gut. It has many functions, including opening up the blood vessels (vasodilation), controlling water absorption in the intestines and helping break down stores of glycogen into glucose in the liver and muscles (which helps control blood sugar levels).

Keeping pancreatic hormones in balance

Insulin is released from the pancreas when blood sugar (glucose) levels rise after a meal. Insulin causes glucose to move out of the blood into cells of the body, resulting in a fall in blood sugar levels. When blood sugar levels return to normal, the pancreas stops making insulin.



Glucagon is released from the pancreas when blood sugar (glucose) levels fall too low. When blood sugar levels return to normal, the pancreas stops making glucagon. Glucagon is also released in response to adrenaline.

Somatostatin blocks the production of insulin and glucagon to help regulate blood sugar levels. Somatostatin increases when either glucagon or insulin levels get too high.

Common problems and conditions of the pancreas

Hyperglycaemia
Hypoglycaemia
Type 1 Diabetes Mellitus
Type 2 Diabetes Mellitus

Gestational diabetes
Pre-diabetes (Impaired glucose tolerance or impaired fasting glucose)