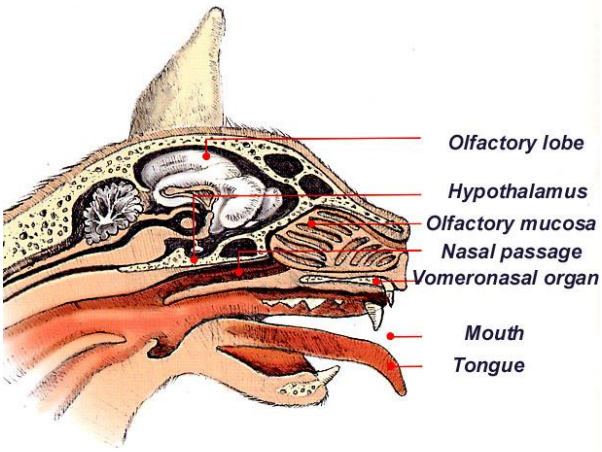
Hypothalamus



Location – the Hypothalamus is found at the Base of the brain.

Structure- the Hypothalamus is part of the brain which contains a number of small nuclei and it's small and oval; similar in size to an almond. The Hypothalamus is to connect to the central nervous system via the pituitary gland; it is also connected to areas of the autonomous nervous system. The hypothalamus receives many signals from the brainstem; mostly from the nucleus of the solitary tract (forms circuits that are used for autonomic regulation), the locus coeruleus (involved with physiological responses such as stress and panic) and the Ventrolateral Medulla.

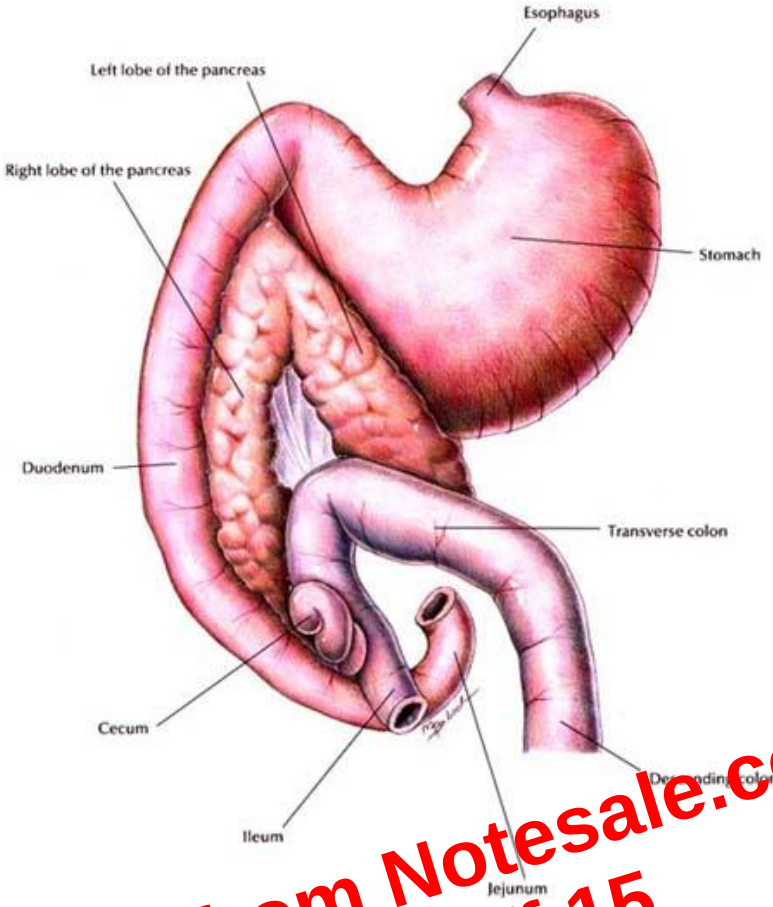
The hypothalamus influences development within the body such as females exhibiting normal reproductive activity and displaying the appropriate reproductive behaviours in adult life. The hypothalamus has the ability to understand and control sexual dimorphism; recognizing the functional difference between man and woman e.g different odours dependent on which sex the odour is released can stimulate different sexual behaviour.

Function- The hypothalamus can regulate various endocrine glands and organs as it is in control of the anterior pituitary gland and has a central neuroendocrine function. The hypothalamus produces Releasing Hormones within the hypothalamic nuclei which can be transported along axons to the median eminence or the posterior pituitary to be stored and released as needed.

Hormones are secreted from either the anterior pituitary or the Posterior Pituitary. The hormones released from the anterior pituitary are:

- Thyrotropin-releasing hormone (TRH) produced by the parvocellular neurosecretory cells of the paraventricular nucleus. Primarily stimulating TSH release, the anterior pituitary also stimulates prolactin release.
- Corticotrophin-releasing hormone (CRH) also produced from parvocellular neurosecretory cells of the paraventricular nucleus stimulates Adrenocorticotrophic Hormone (ACTH) release.
- Dopamine (DA) produced by the Dopamine neurons of the arcuate nucleus which prevents prolactin release.
- Growth-hormone-releasing hormone (GHRH) produced by the neuroendocrine neurons of the arcuate nucleus and stimulates growth-hormone (GH) release.

Pancreas



Location – Found near to the stomach and attached to the wall of the small intestine.

Structure- The pancreas is situated towards in the cranio dorsal part of the abdomen sitting closely to the duodenum. The pancreas can be separated into three areas; the body and left and right lobes. The lobes are loosely attached via connective tissues which contain blood vessels, nerves and clear-fluid carrying lymphatics. There is a main vein that runs between the left and right lobes which varies in structure dependent on species and dietary requirements; those requiring carnivorous diets such as felines have a pancreas which is clearly distinguishable as a body with left and right lobes with the main vein running between the lobes. The tip of the left lobe contacts the left kidney and lies in the greater Omentum (a long fold of visceral peritoneum hanging down from the start of the stomach); which is the smallest lobe out of the two. The right lobe is found in the Mesoduodenum. Within the pancreas there are two ducts; the pancreatic duct and the Accessory duct. The Pancreatic duct is largest, is located at the opening of the duodenum and is the major duodenal papilla; used for the secretion of bile and other enzymes aiding digestion. The Accessory duct is the minor duodenal papilla and opens on the opposite side of the duodenum. During development in felines the accessory duct eventually declines in effectiveness due to underuse so the pancreatic duct persists.

Function – The pancreas aids maintenance of the correct glucose (blood sugar) level using hormones it produces and secretes into the bloodstream called Insulin and Glucagon. These hormones plays an important part in absorption of glucose which is passed through the wall of the digestive tract after starches and carbohydrates are eaten and broken down into sugar glucose and then passes through the blood stream; with Insulin allowing the glucose to leave the bloodstream to enter the body's tissues. The glucose then can be used as energy for the cells or it can be stored within the liver via the hormone glucagon when glucose levels are too high; and also stored in the muscles as glycogen. Sometimes not enough insulin can be produced and this then causes diabetes mellitus (sugar diabetes).